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C T D - DATA FROM THE NORTH CANARY BASIN

- "POSEIDON" CRUISE 86/2 -

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VON

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ZUSAMMENFASSUNG

Im Rahmen des Sonderforschungsbereichs 133 (Warmwassersphäre des Atlantiks) wurden im Frühjahr 1982 während der 86. Reise von F.S. POSEIDON durch Mitglieder des Instituts für Angewandte Physik und des Instituts für Meereskunde umfangreiche hydrographische Messungen mit der Kieler Multisonde im nördlichen Kanarenbecken vorgenommen. Dieser Datenband erlaubt durch die Darstellung vertikaler Profile und Schnitte von Temperatur, Salzgehalt und Anomalien des spezifischen Volumens sowie von T/S-Diagrammen erste Einblicke in die mesoskaligen hydrographischen Verhältnisse des Seegebiets zwischen Madeira und den Azoren.

SUMMARY

During the "POSEIDON" cruise 86/2 in early spring 1982 a mesoscale hydrographic survey was carried out by groups of the Institut für Angewandte Physik and the Institut für Meereskunde. The experiment took place in the northern Canary Basin between Madeira and the Azores. This data report presents vertical profiles and sections of temperature, salinity and specific volume anomalies as well as selected T/S diagrammes obtained by means of the Kiel Multisonde.

INTRODUCTION

This report presents observations of temperature and salinity in the upper 1500 m of the North Canary Basin. The observations were made in a mesoscale box onboard FS "Poseidon" between Madeira and the Azores (Fig. 1, 2). The cruise was part of the research programme of the SFB 133 ("Warmwassersphäre des Atlantiks") sponsored by the German Research Society (DFG). The main scientific aim was to obtain a quasi-synoptic mesoscale data set to be compared with currents from geostrophic calculations and satellite-tracked drift buoys with a drogue at 100 m depth deployed earlier in this area by FS "Meteor". No scientific interpretation of the data is given in this paper. A first insight into the geostrophic current field as resulting from objective analysis can be obtained from Fig. 4 showing a meandering jet-like surface current connected with a thermohaline front. Preliminary scientific results are discussed in Käse & Siedler (1982).

INSTRUMENTATION AND DATA STORAGE

The instrument used during the cruise was the "Multisonde" which was constructed by the Institute of Applied Physics of the Kiel University. The Multisonde was equipped with standard CTD sensors and sensors measuring the extinction of light (red, difference red-blue), oxygen and sound velocity.

In addition, several newly developed fast responding platinum-thermometers (Kroebel, 1981) were included in the Multisonde-system. These high resolution sensors were sampled at a rate in between 50 and 100 Hz. A pair of fast responding thermometers was used to determine the horizontal temperature finestructure. Table 1 summarizes the specifications of the sensors.

Table 1

Parameter	Symbol	Units	Resolution	Accuracy	
PRESSURE	P1	dbar	0.1	5	CTD
TEMPERATURE	T1	deg C	0.001	0.005	CTD
CONDUCTIVITY	L1	mS/cm	0.001	0.005	CTD
TEMPERATURE	T0	deg C	0.001	0.005	0.5m above T
TEMPERATURE	T4	deg C	0.001	0.05	fast respons:
TEMPERATURE	T7	deg C	0.001	0.05	-"-
TEMPERATURE	T9	deg C	0.001	0.1	-"-
DIFF.Temperature	T8	deg C	0.0001	0.05	-"-
ATTENUATION	R0	1/m	0.0001	0.02	red light
ATTENUATION	R1	1/m	0.001	0.1	-"-
DIFF.ATTENUATION	RB	1/m	0.001	0.1	red-blue
OXYGEN	O2	mg/l	0.001	1	
SOUND VELOCITY	V1	m/s	0.01	0.05	
<u>derived quantities</u>					
SALINITY (*)	S0	ppt	0.001	0.005	Unesco 81
ANOMALY (*)	D0	cm ³ /kg	0.001	0.005	-"-
SOUND VELOCITY	DG	m/s	0.01	0.01	DelGrosso

(*) from P1, T0, L1.

Since the telemetric device using a 60 KHz transmission only allows the sampling at 1/640 Hz, not all the sensors could be deployed simultaneously. We applied several combinations in addition to the standard CTD sensors P1, T1, L1, T0.

Original data and derived quantities were recorded on magnetic tapes using a NOVA Computer, run with special operational systems (DT7. Rathlev, 1981). Simultaneously, CTD data were transmitted at a lower sampling rate (0.4Hz) to a second NOVA Computer where further calculations (e.g. dynamic height, depth of isothermes etc.) and quick look display were carried out (see Fig. 3).

GRAPHICAL PRESENTATION

All the profile graphics presented here were made onboard right after the cast. When a section had been completed, contours of isolines were determined and plotted automatically.

Included in this volume are only CTD data; other parameters will be presented elsewhere.

Preliminary checks of salinity and temperature revealed no significant deviations from the laboratory calibration of the Multisonde. In order to present data as soon as possible after the cruise no corrections were performed with the data set at this stage.

The figures shown are grouped into three chapters. Chapter 1 contains vertical profiles of temperature, salinity and anomaly of specific volume. Since the electronic circuit of T1 had a fault at high temperatures, the values of the second sensor T0 are shown in all graphics. All derived parameters are computed from T0, too. Chapter 2 shows selected T/S diagrammes and Chapter 3 includes several meridional sections with different vertical resolution.

LITERATURE

- Käse, R.H. & G. Siedler, 1982: Meandering of the sub-tropical front southeast of the Azores. NATURE. submitted
- Kroebe, W., 1981: A thermometer for oceanographic research with a time constant of about 1 ms and a resolution of less than 0.001K: Its properties and results of its application on cruises. IEEE-J. of Oceanic Engineering, vol. OE-6, 4.118-124
- Rathlev J., 1981: DT7 - Data Transfer Programme Rev. 7.5, User's Manual. Institute of Applied Physics, Kiel University. unpublished manuscript.

Acknowledgement:

The cooperation of the officers and crew of FS "Poseidon". Captain H. Schmickler commanding, is gratefully acknowledged. We are indebted to Mssrs. N.v. Bosse, K.H. Mahrt, P. Reimer, H.C. Waldmann of the Institut für Angewandte Physik and J. Brandt, W. Hiller, J. Holtorff of the Institut für Meereskunde an der Universität Kiel, whose efforts on the cruise made these data available.

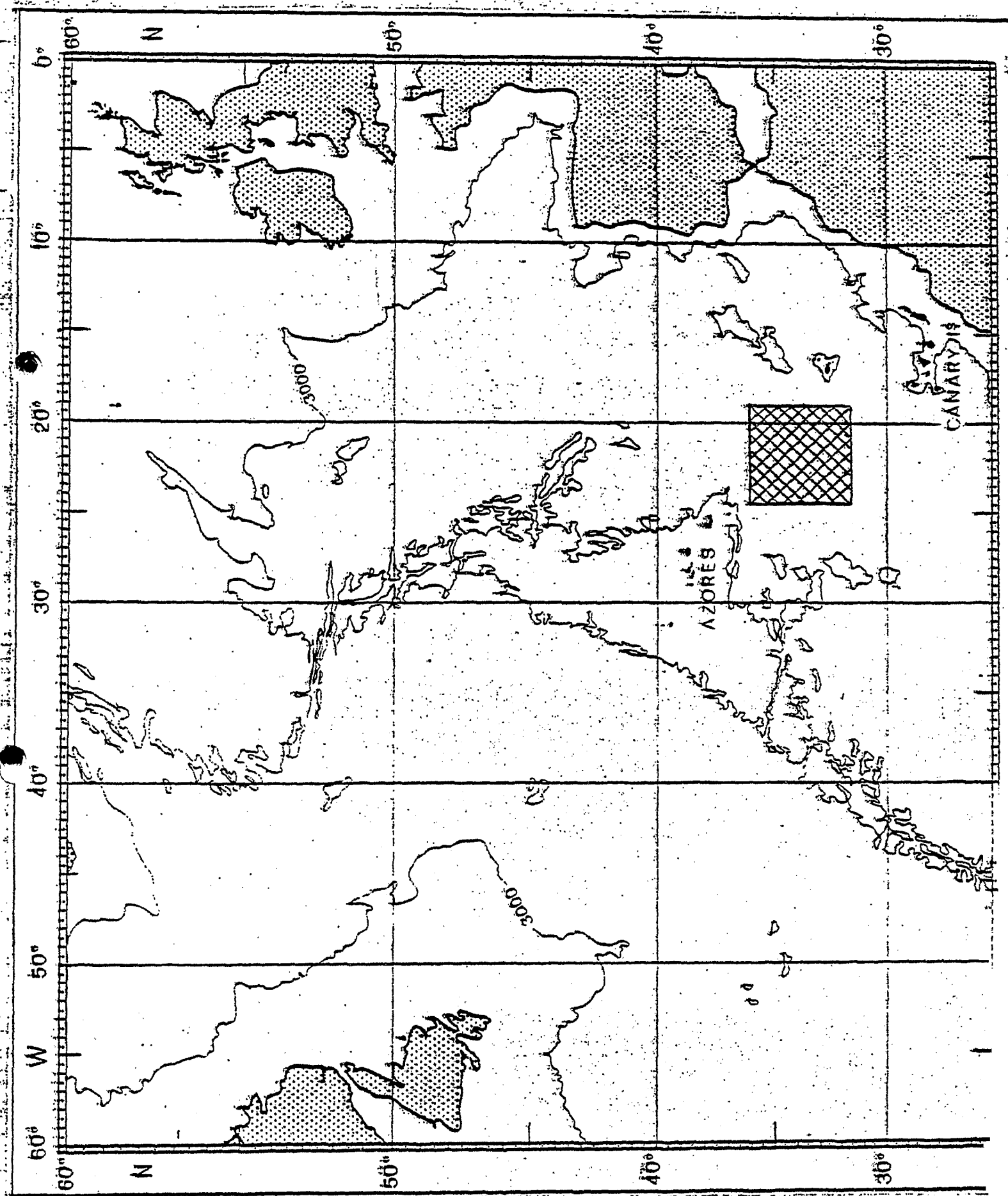


Fig. 1: LOCATION OF HYDROGRAPHIC BOX DURING POSEIDON CRUISE 86/2.

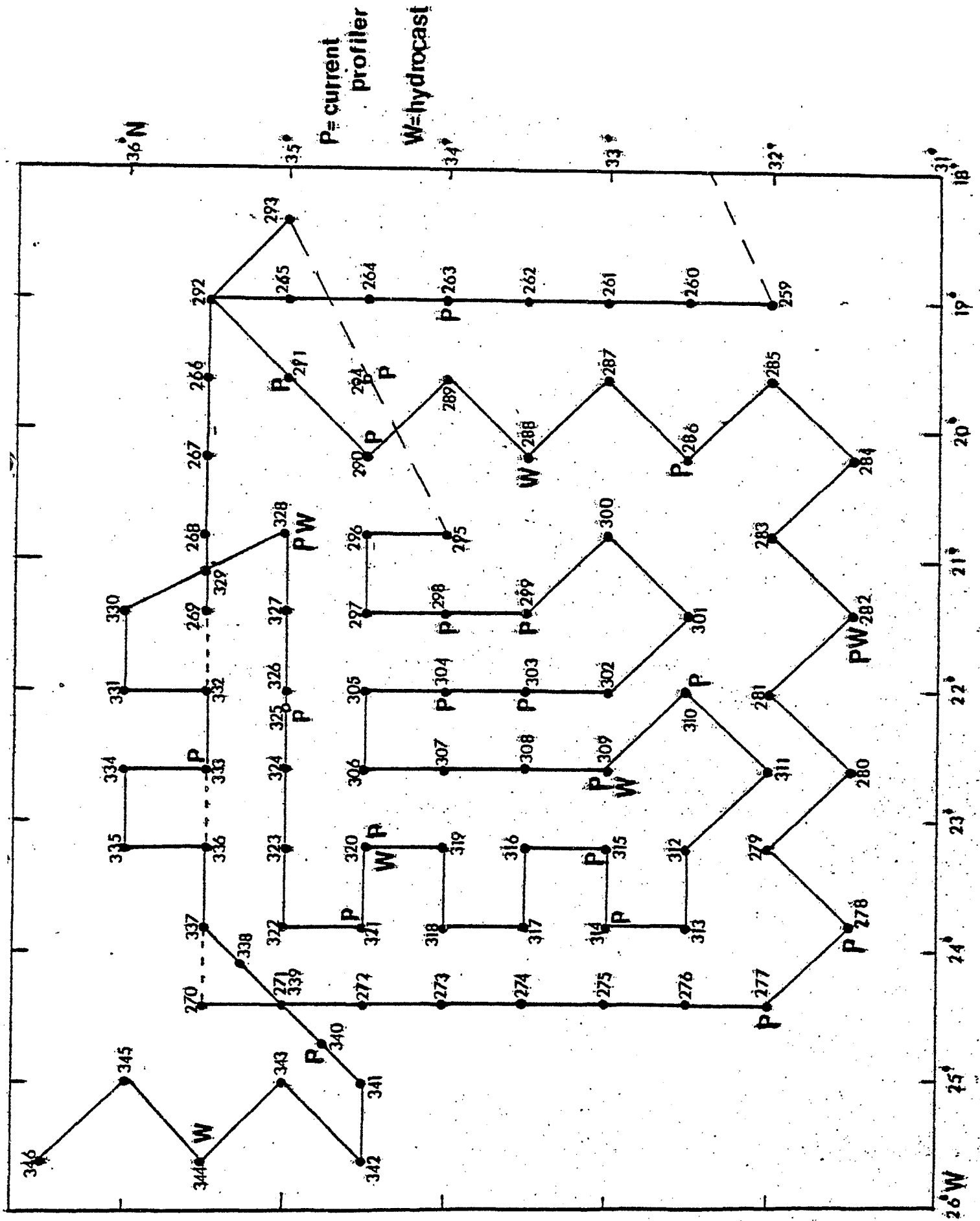
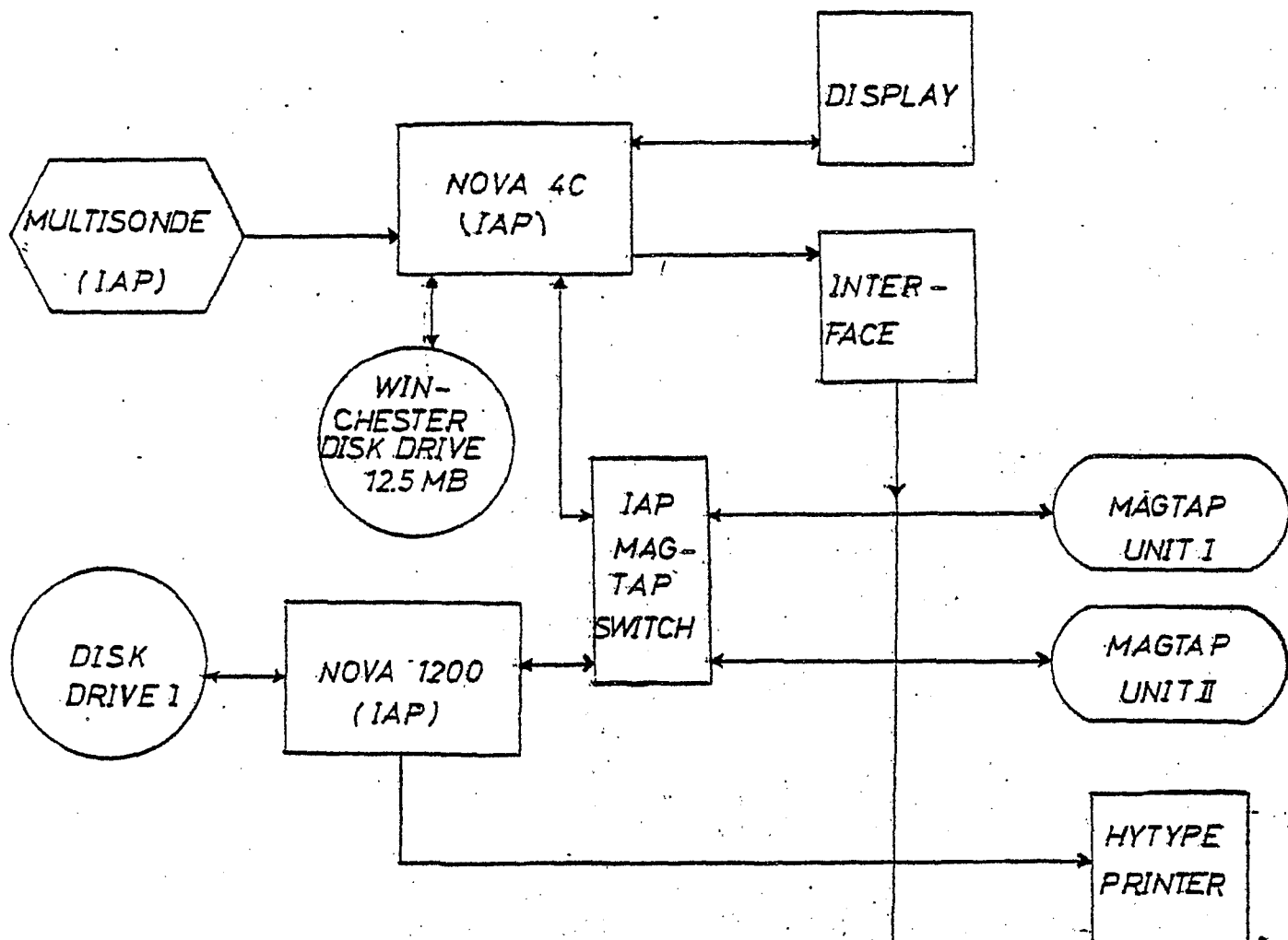
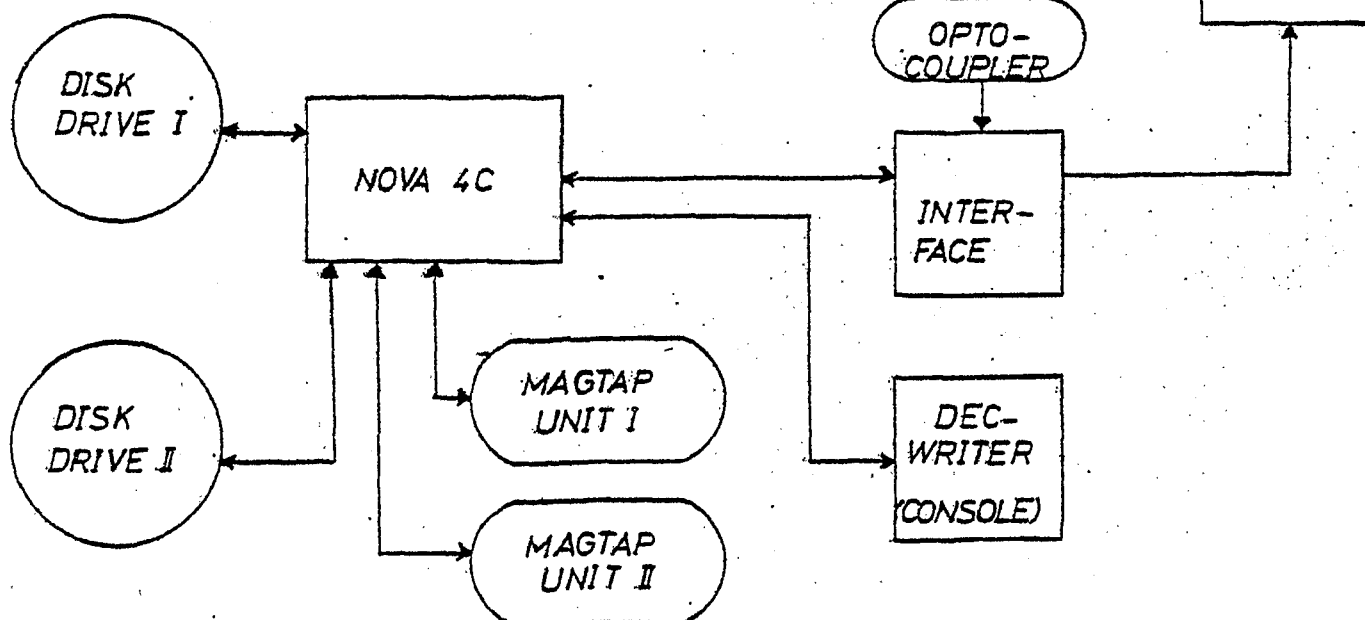


Fig. 2: LOCATION OF STATIONS

1. CTD DATA LOGGING (HIGH SAMPLING RATE)
& STANDARD PROCESSING (IAP)



2. CTD DATA LOGGING (REDUCED SAMPLING RATE)
& PRELIMINARY SCIENTIFIC ANALYSIS



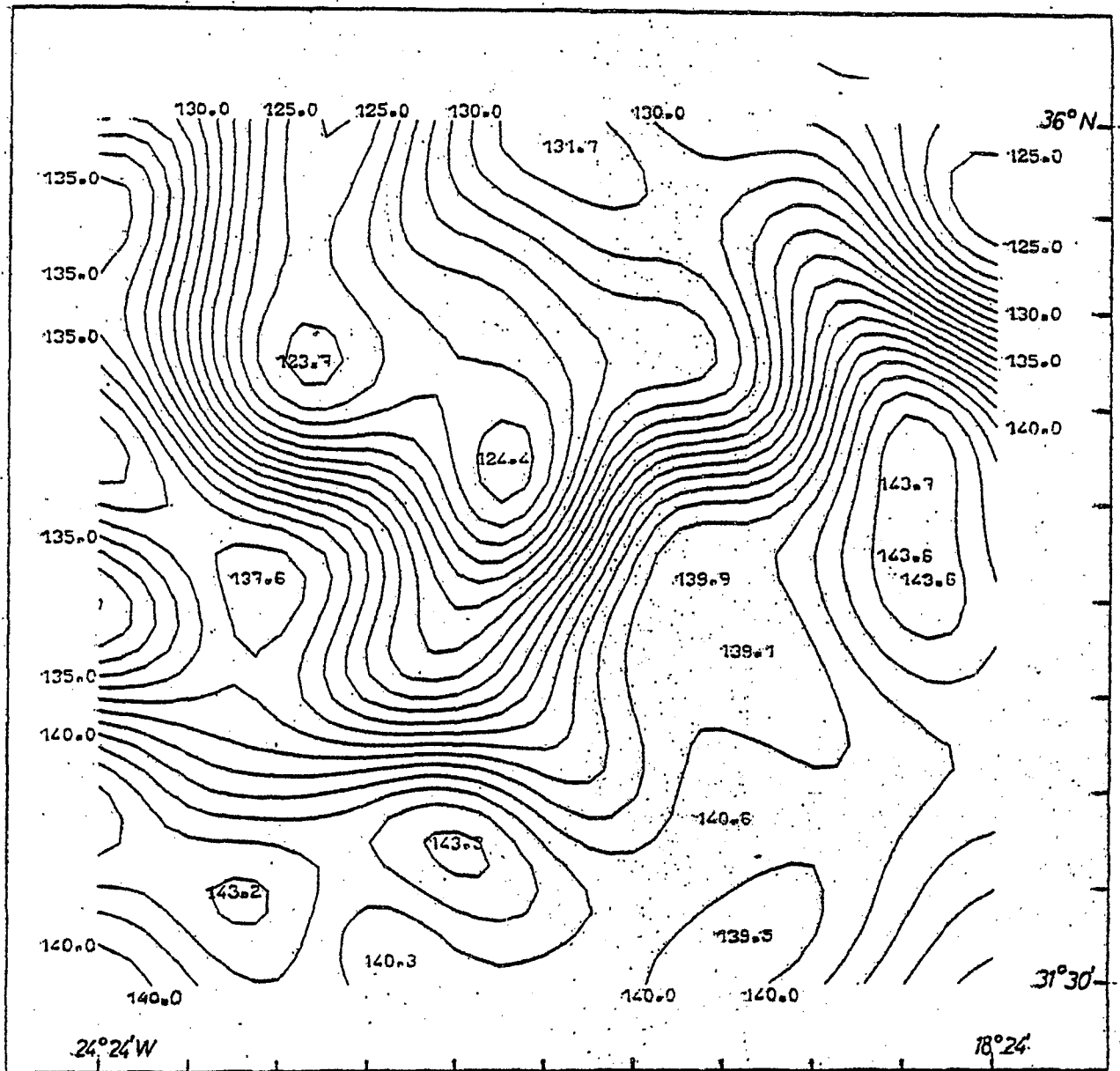


Fig. 4: ESTIMATED DYNAMIC HEIGHT CONTOURS (dyn cm) RELATING TO 1500 dBar

STATION LIST MULTISONDE

POSEIDON 86 - 2

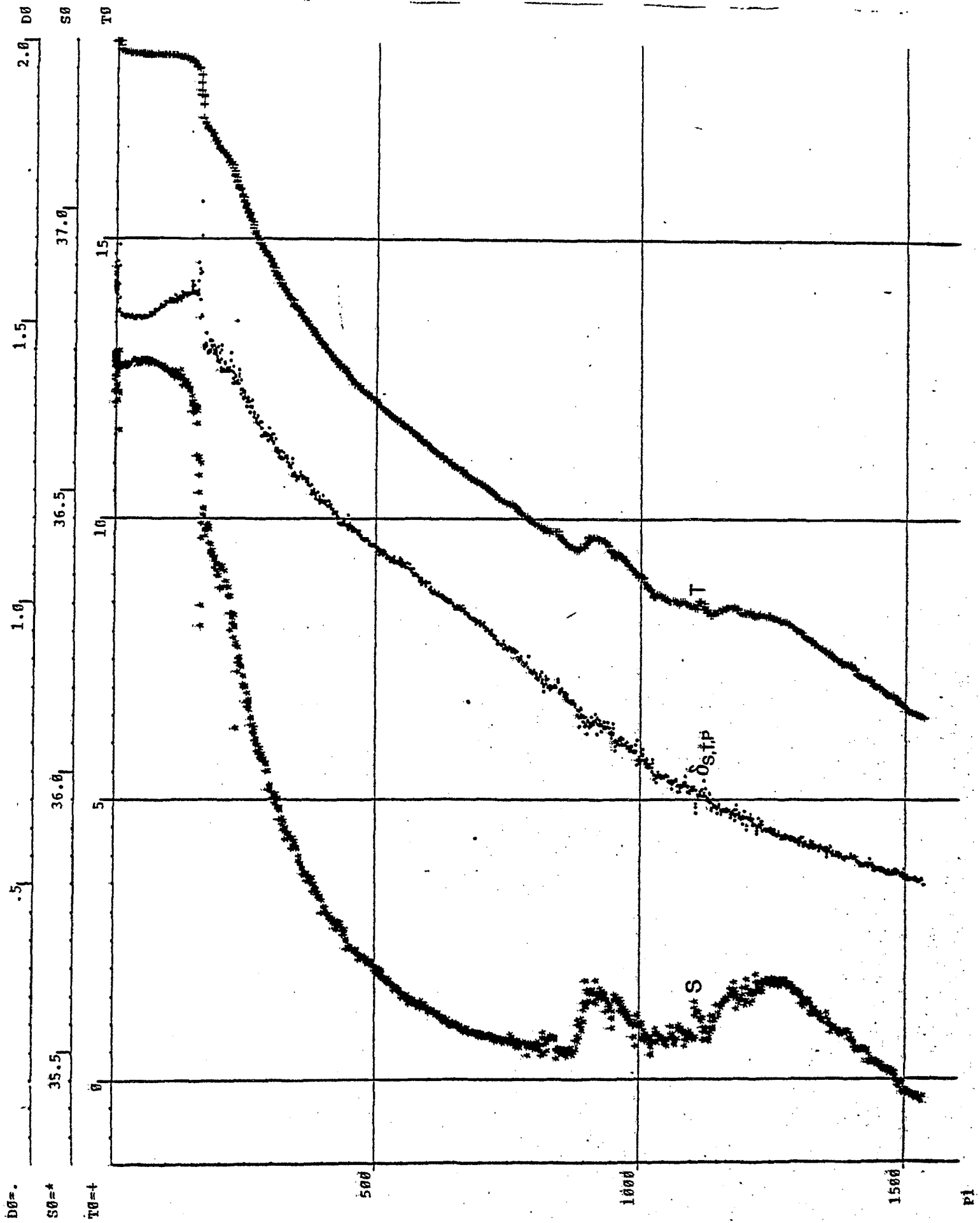
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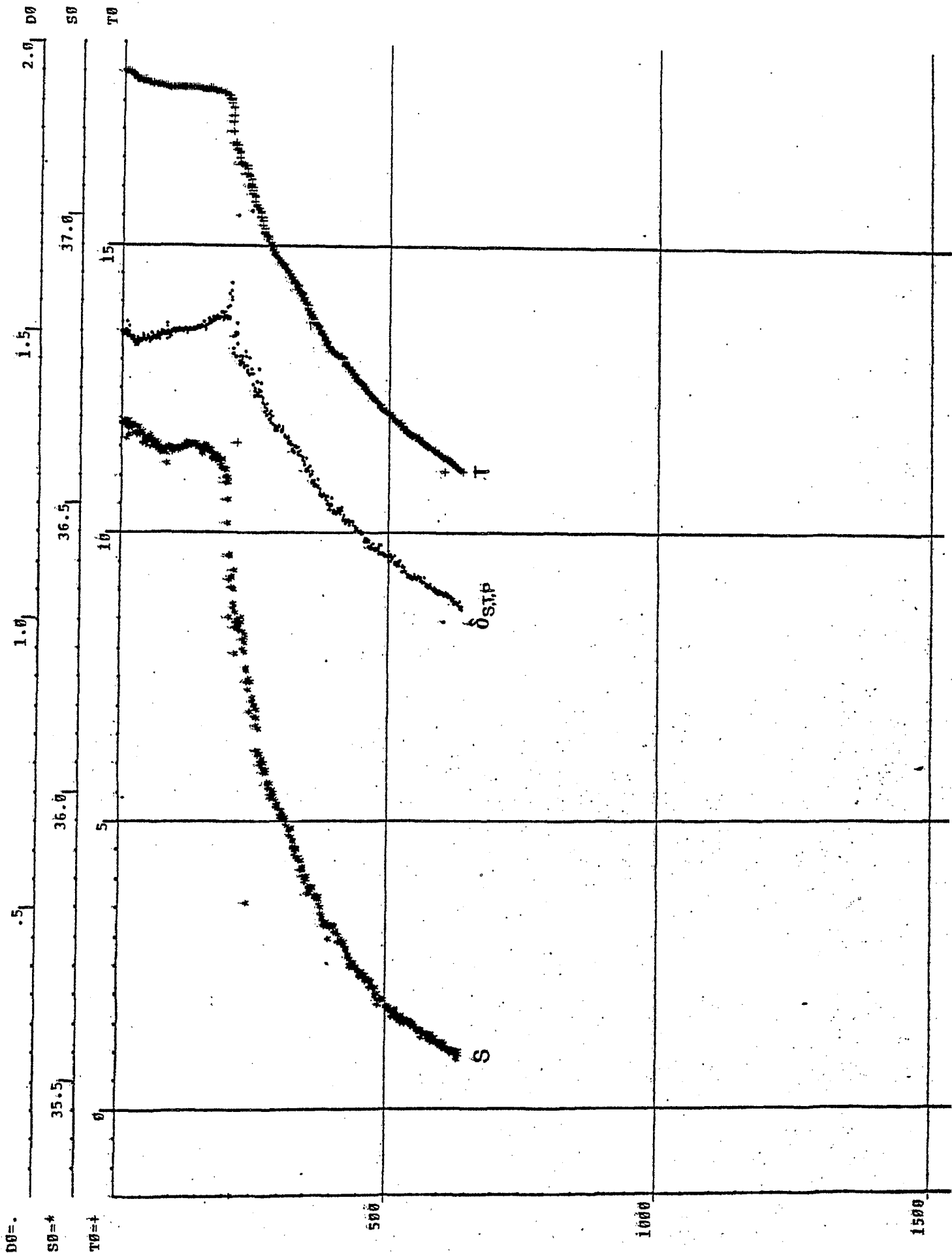
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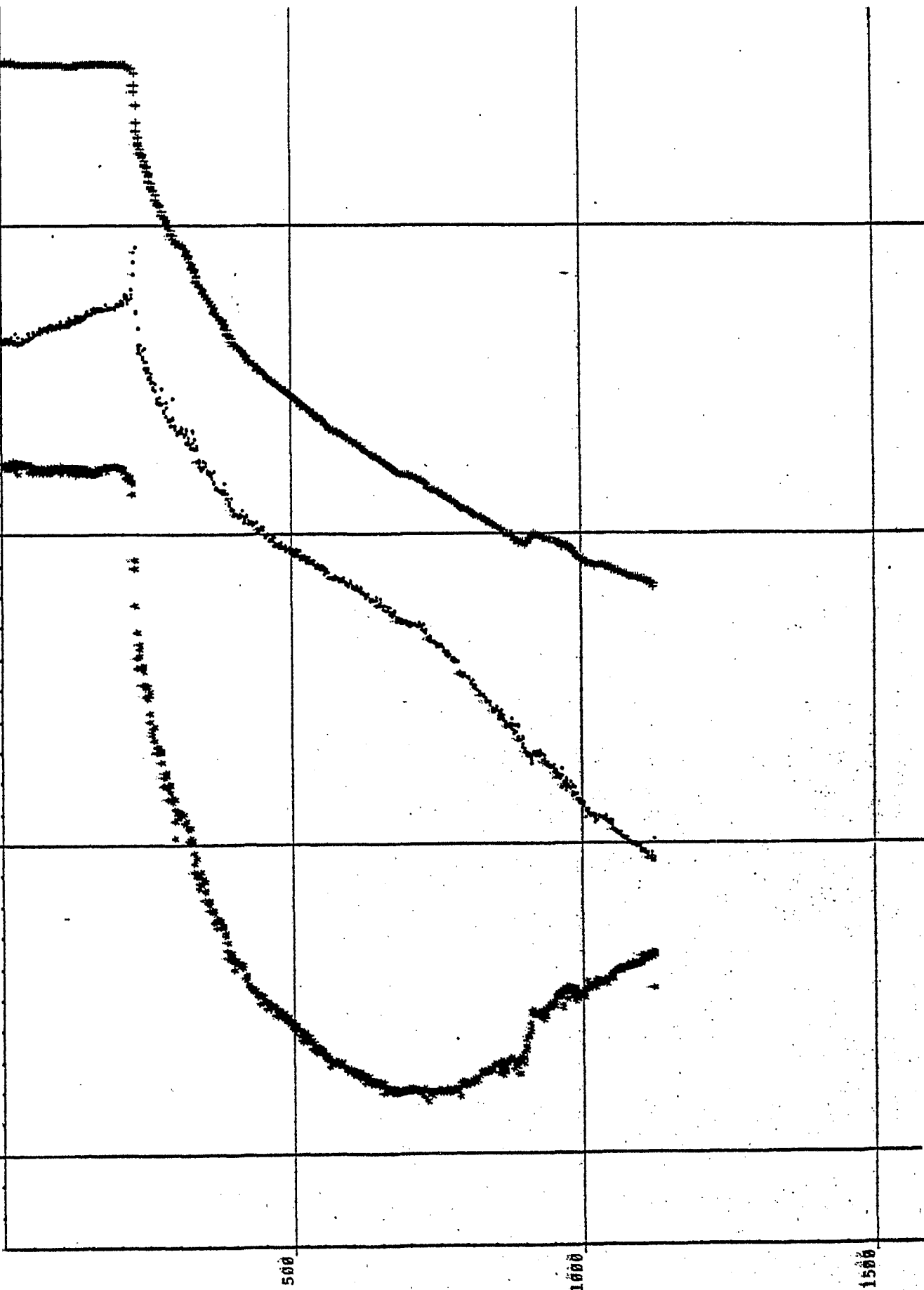


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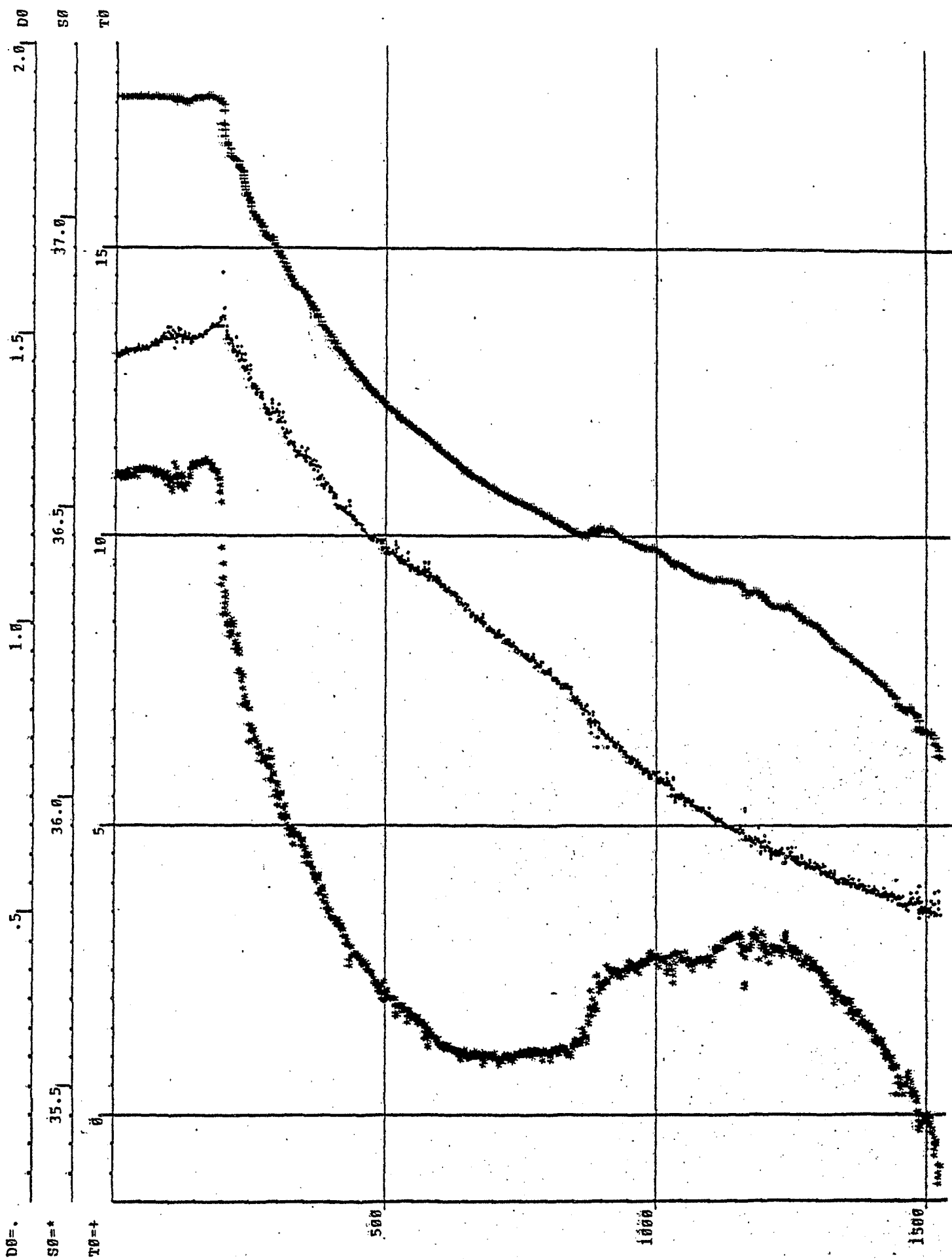
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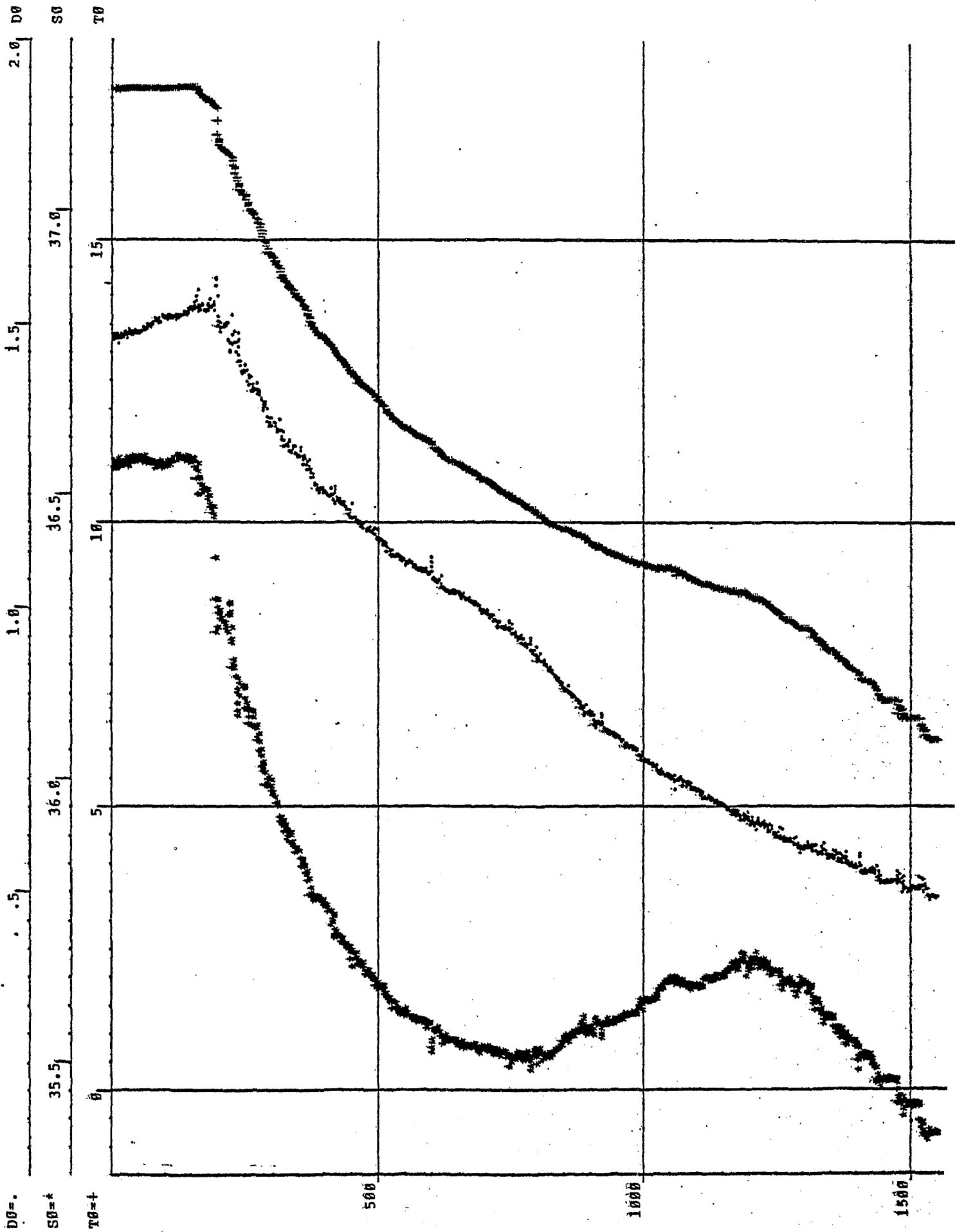
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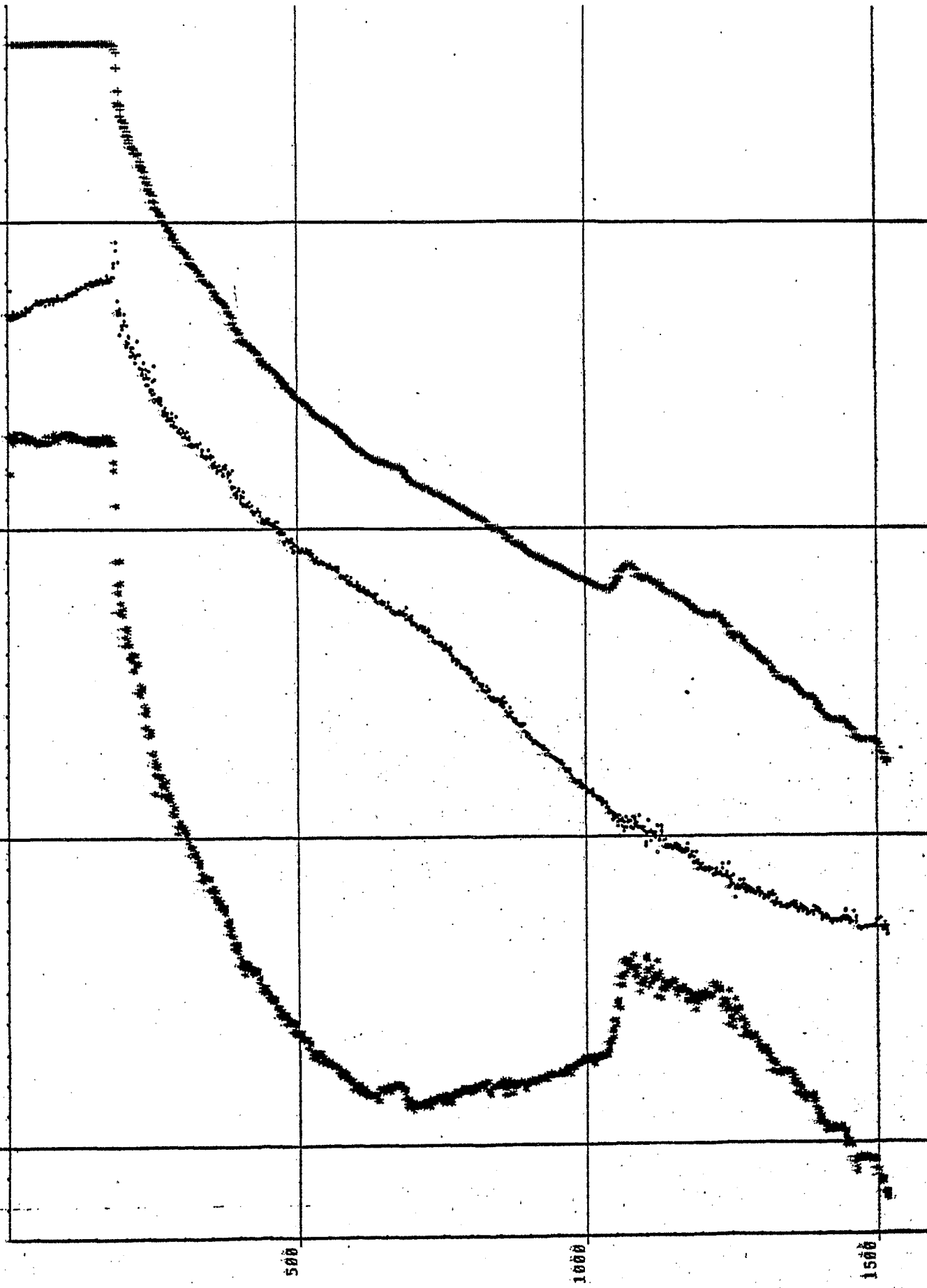


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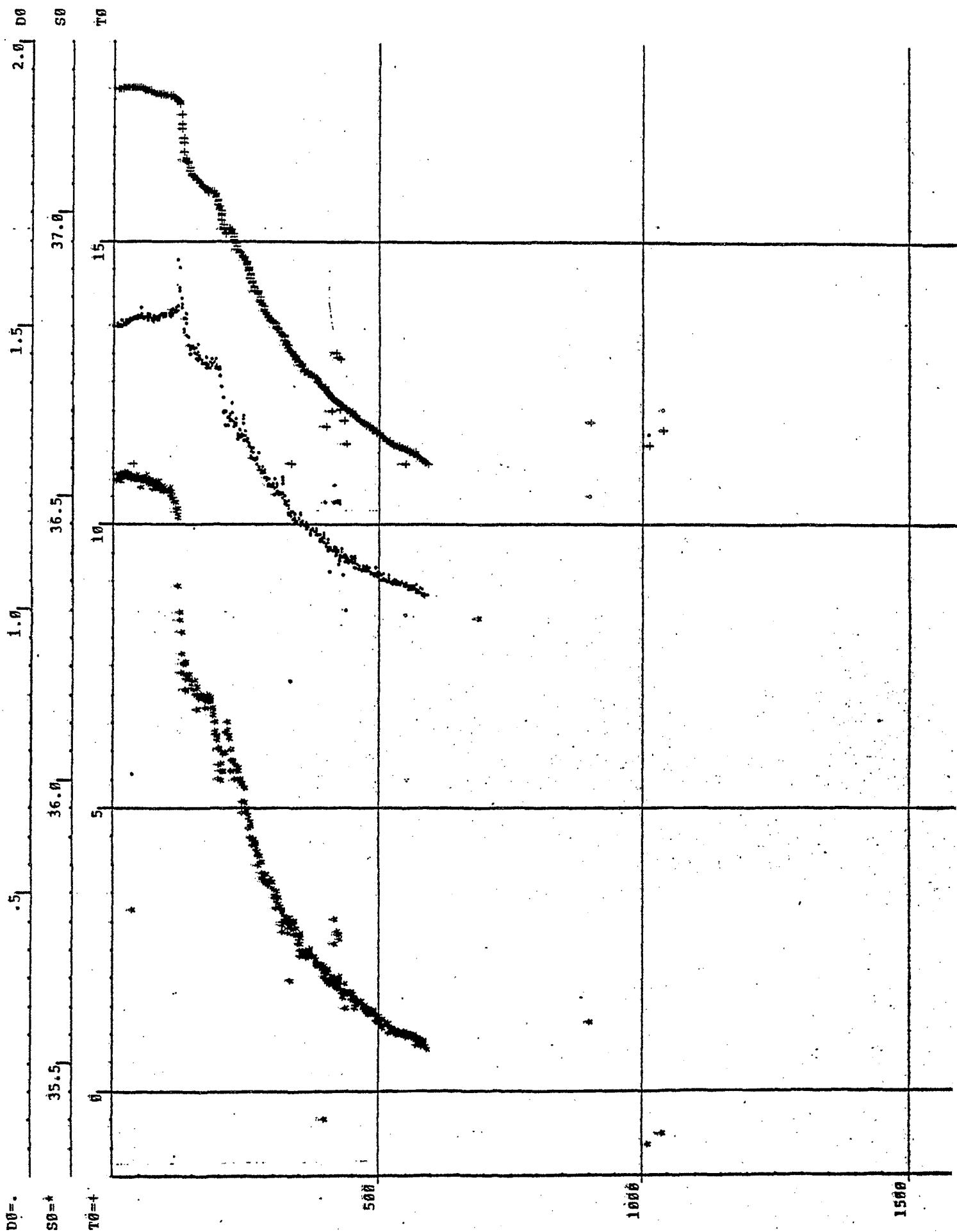
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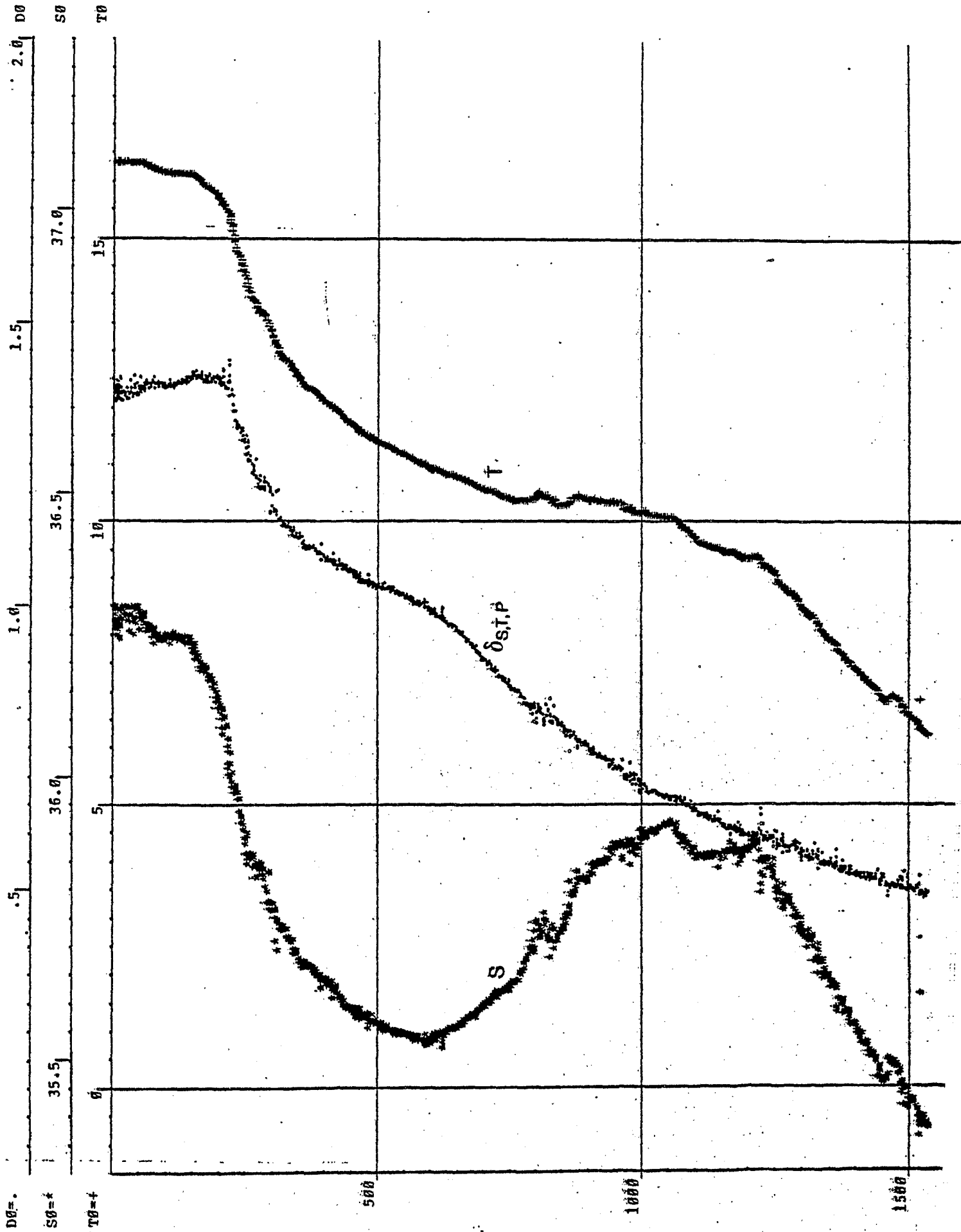
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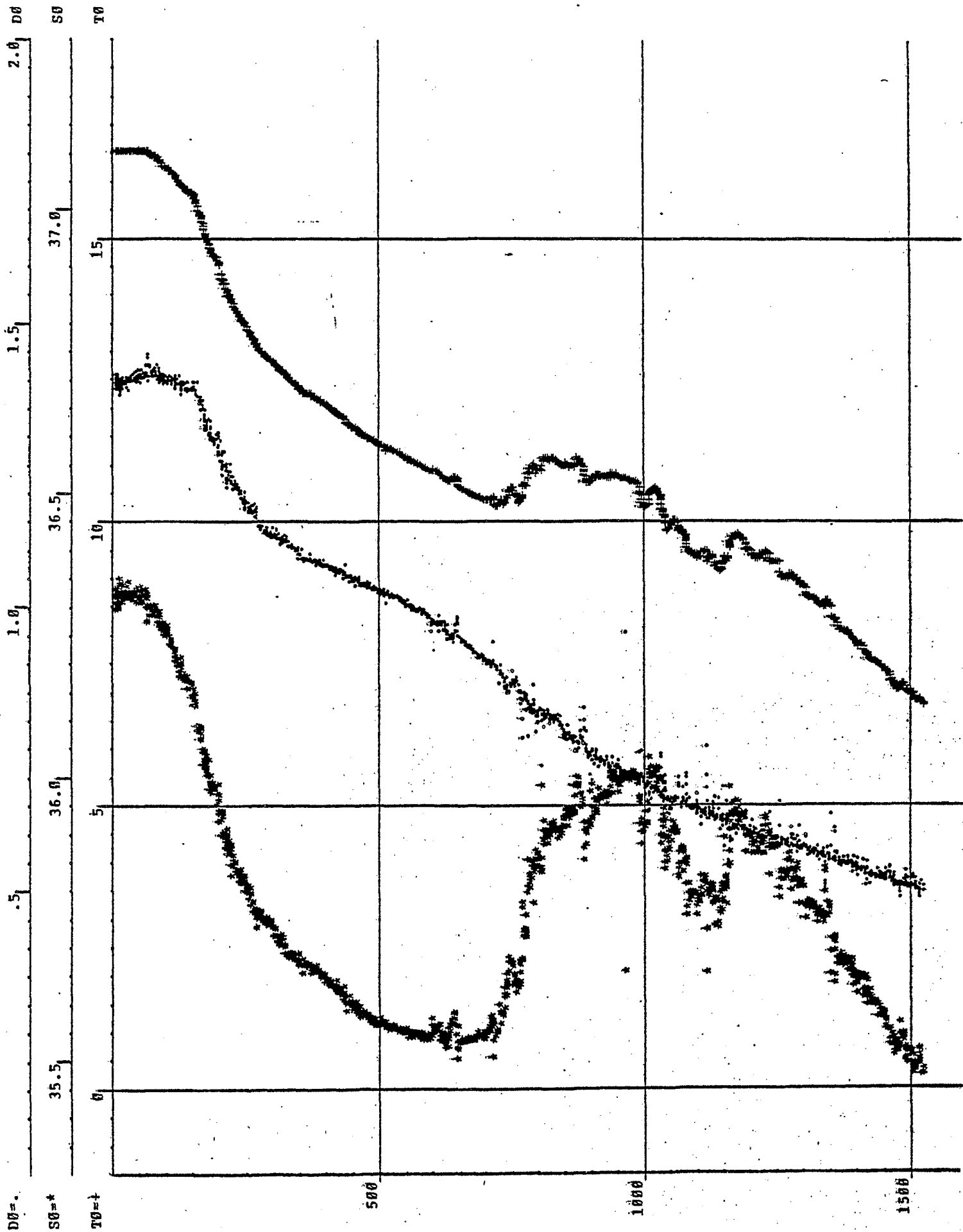
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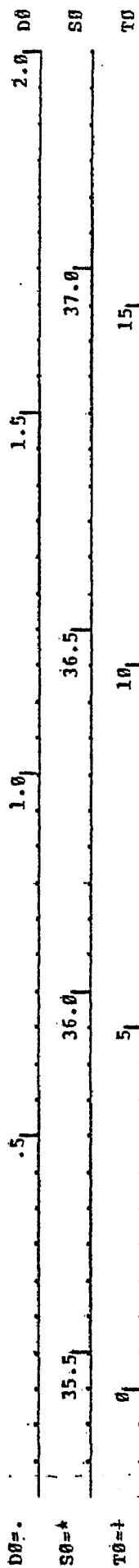
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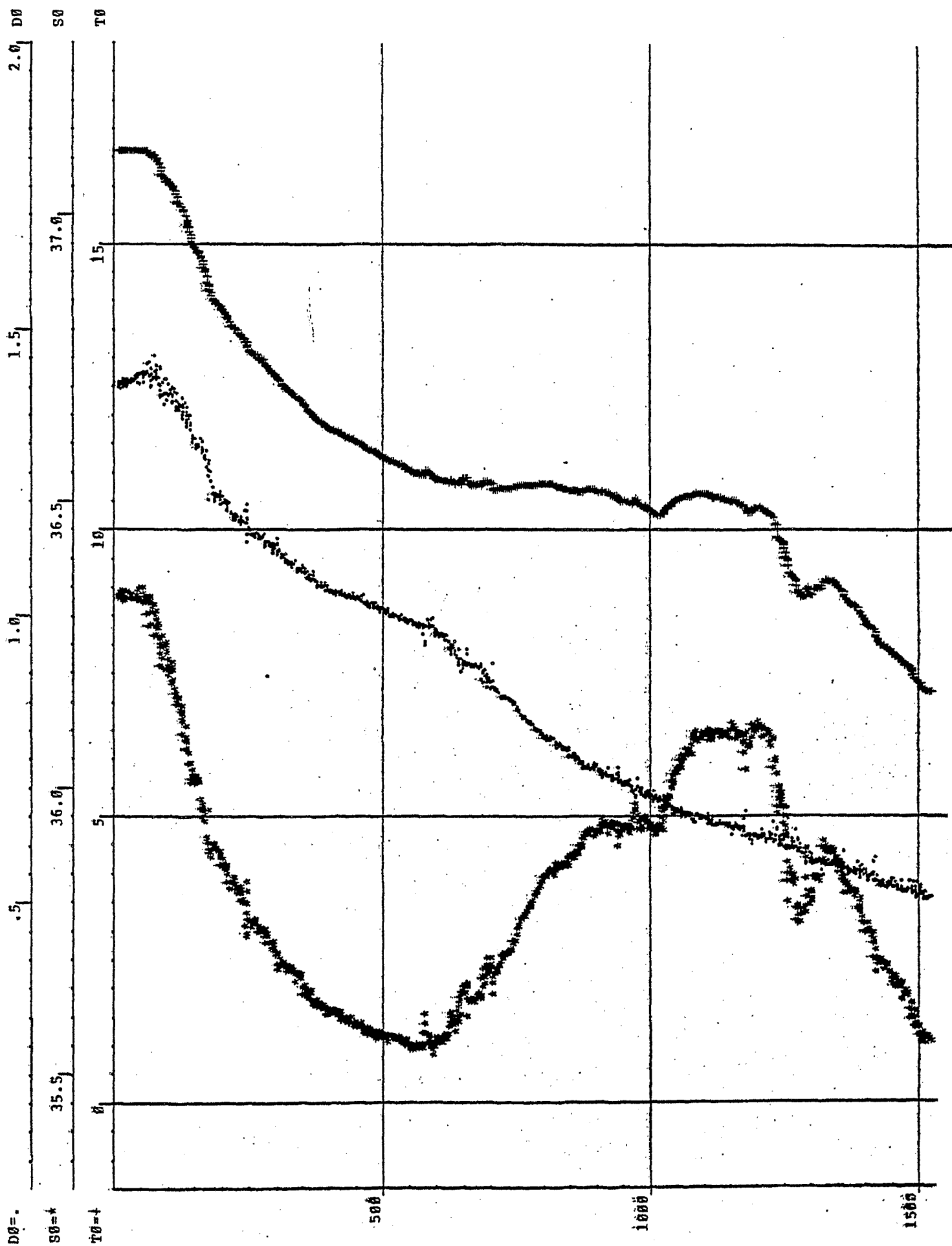
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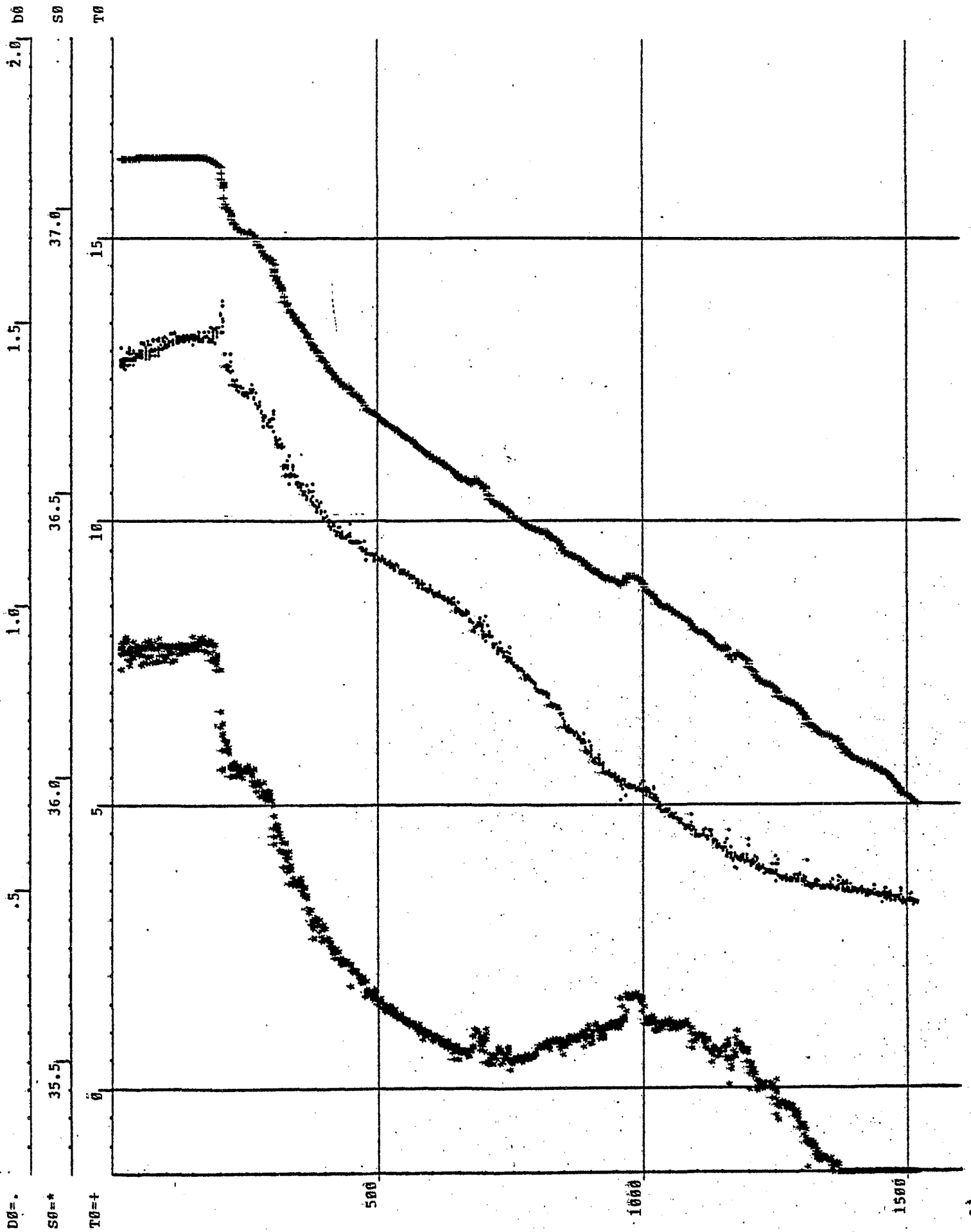
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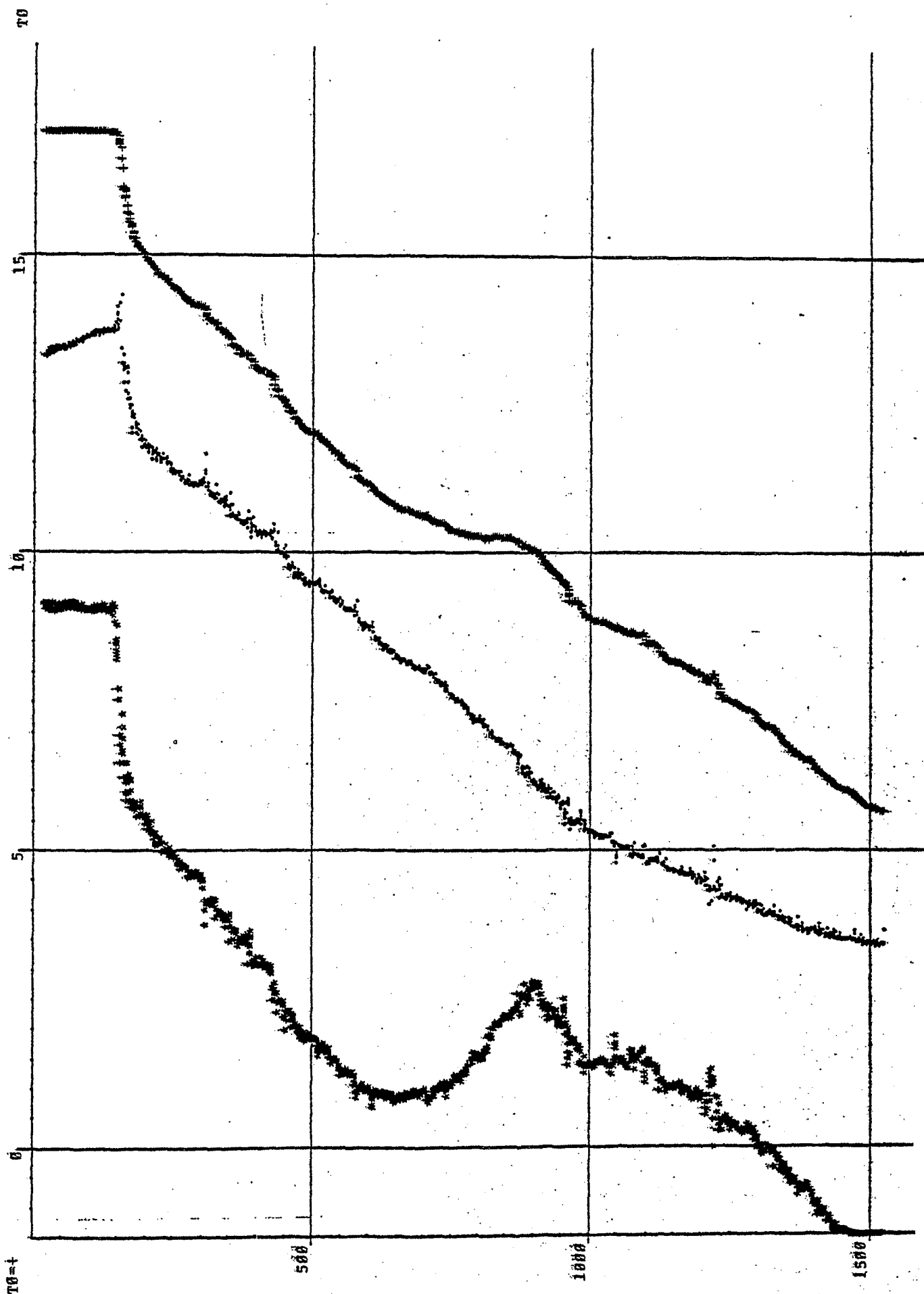


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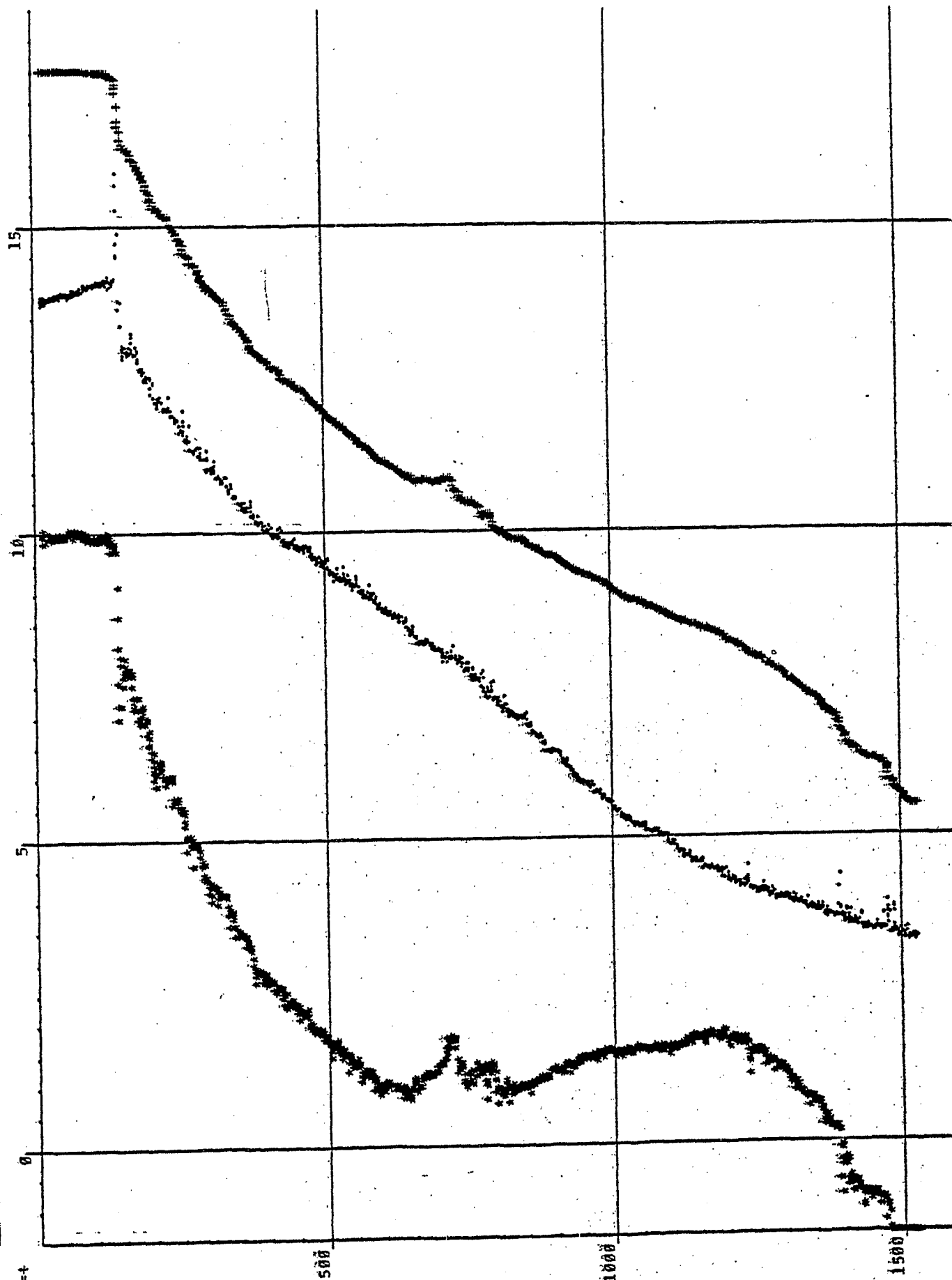
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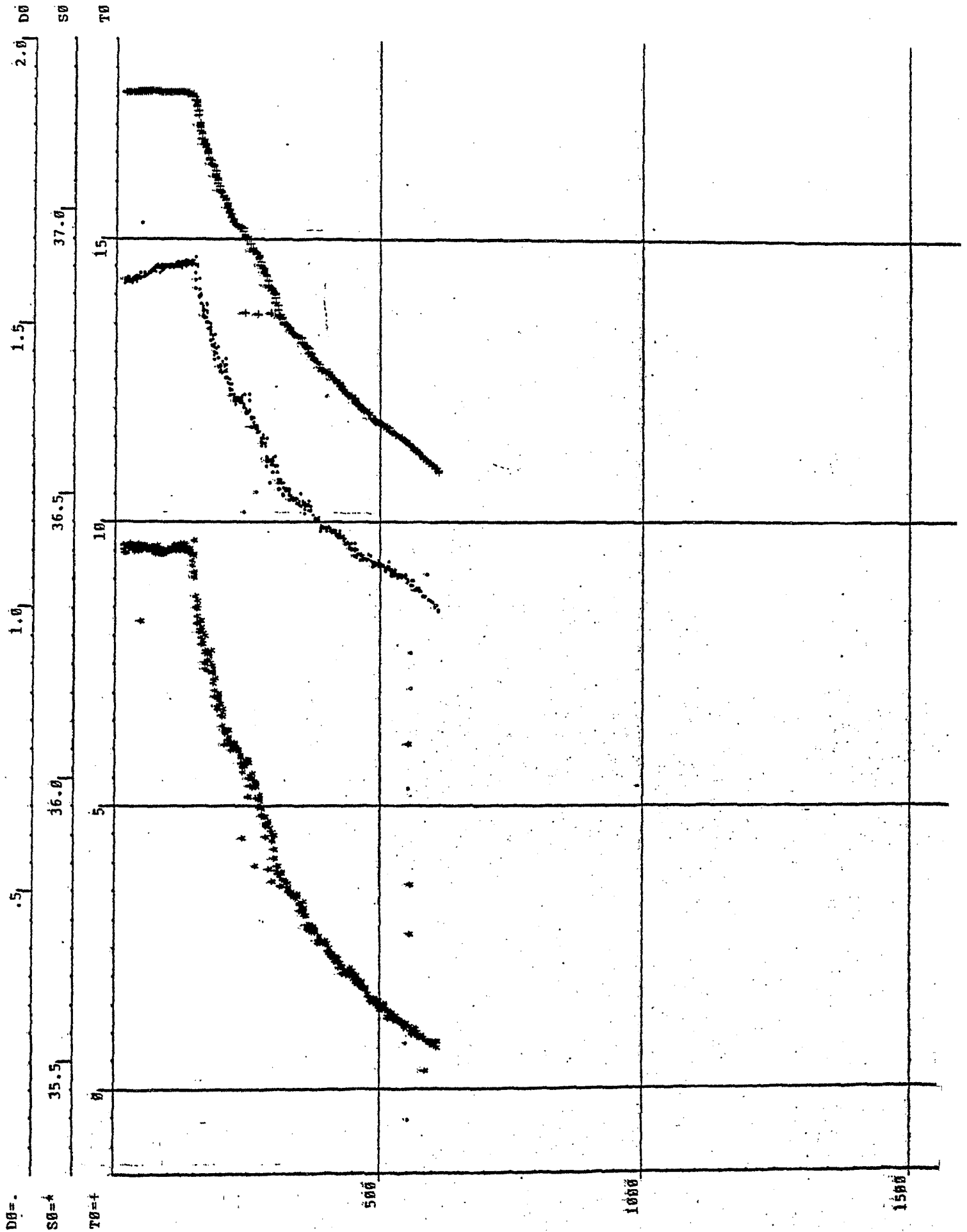


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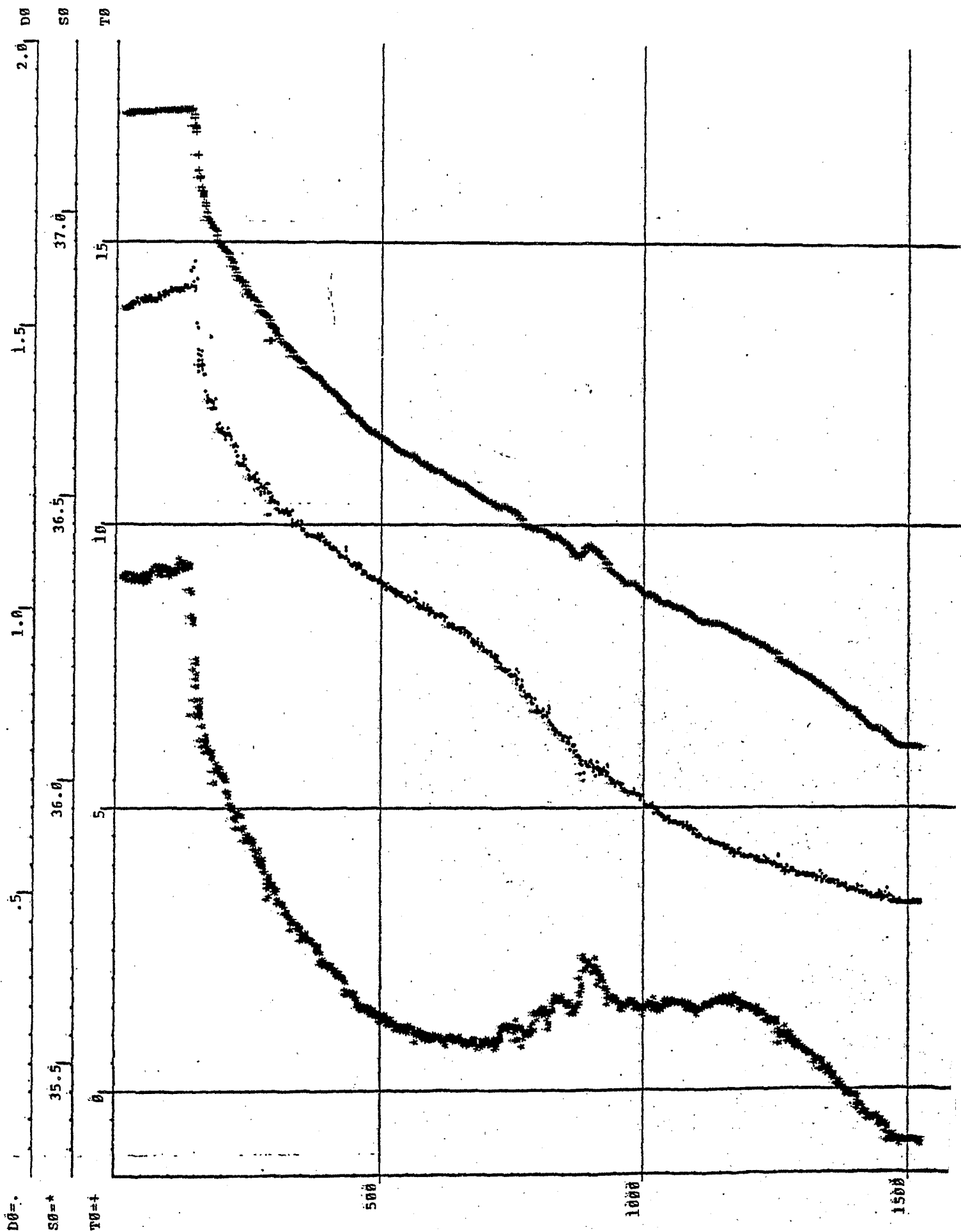
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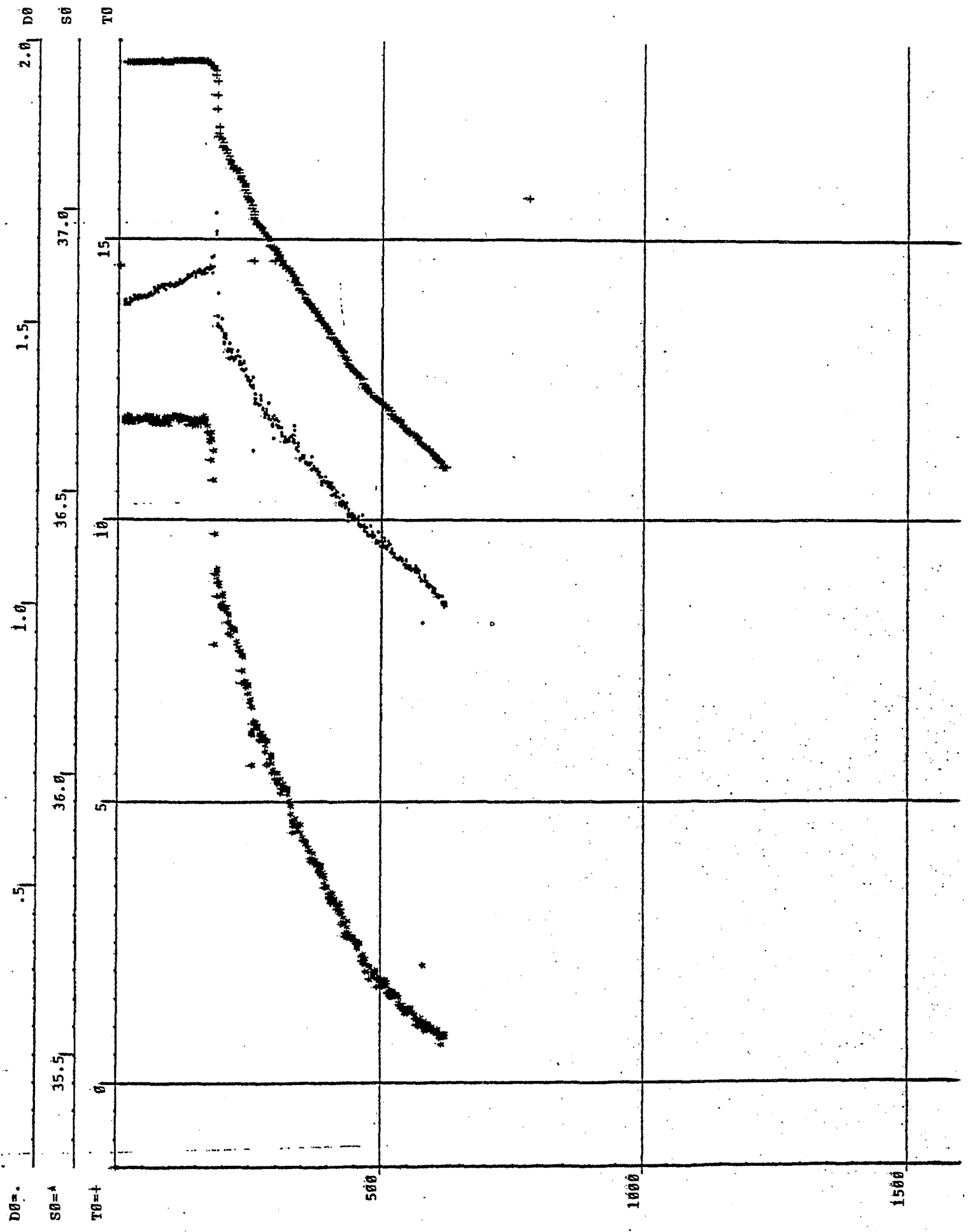
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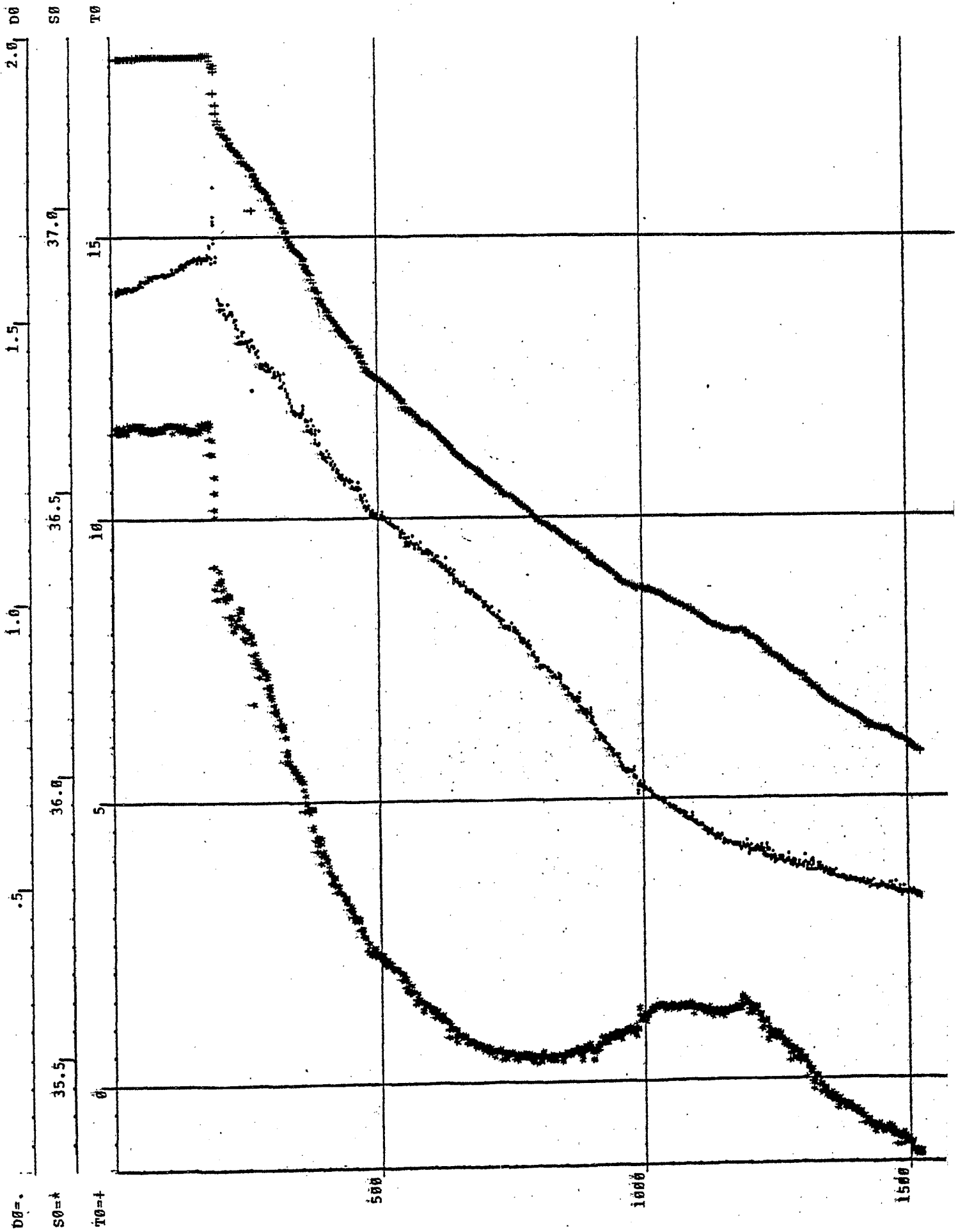
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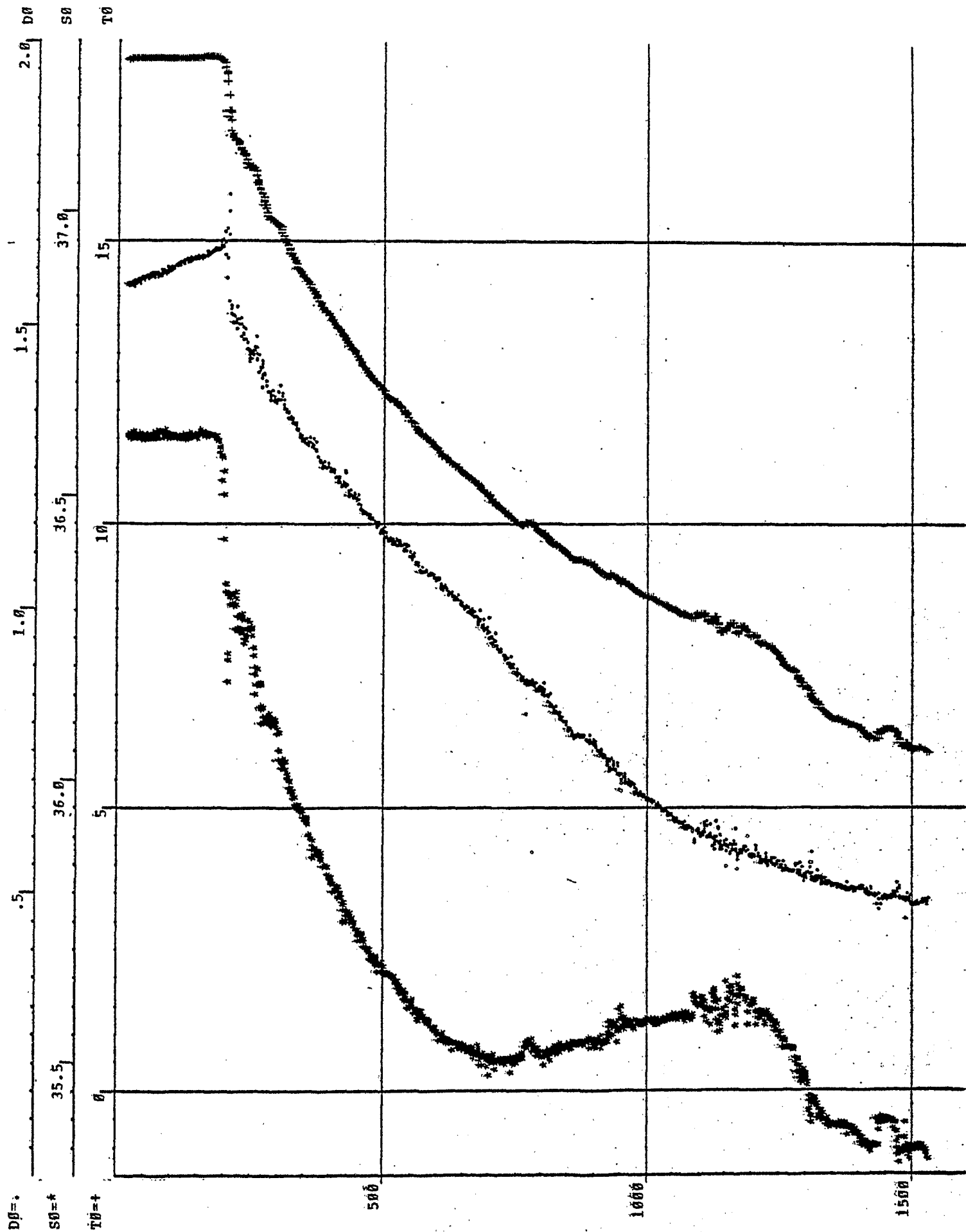
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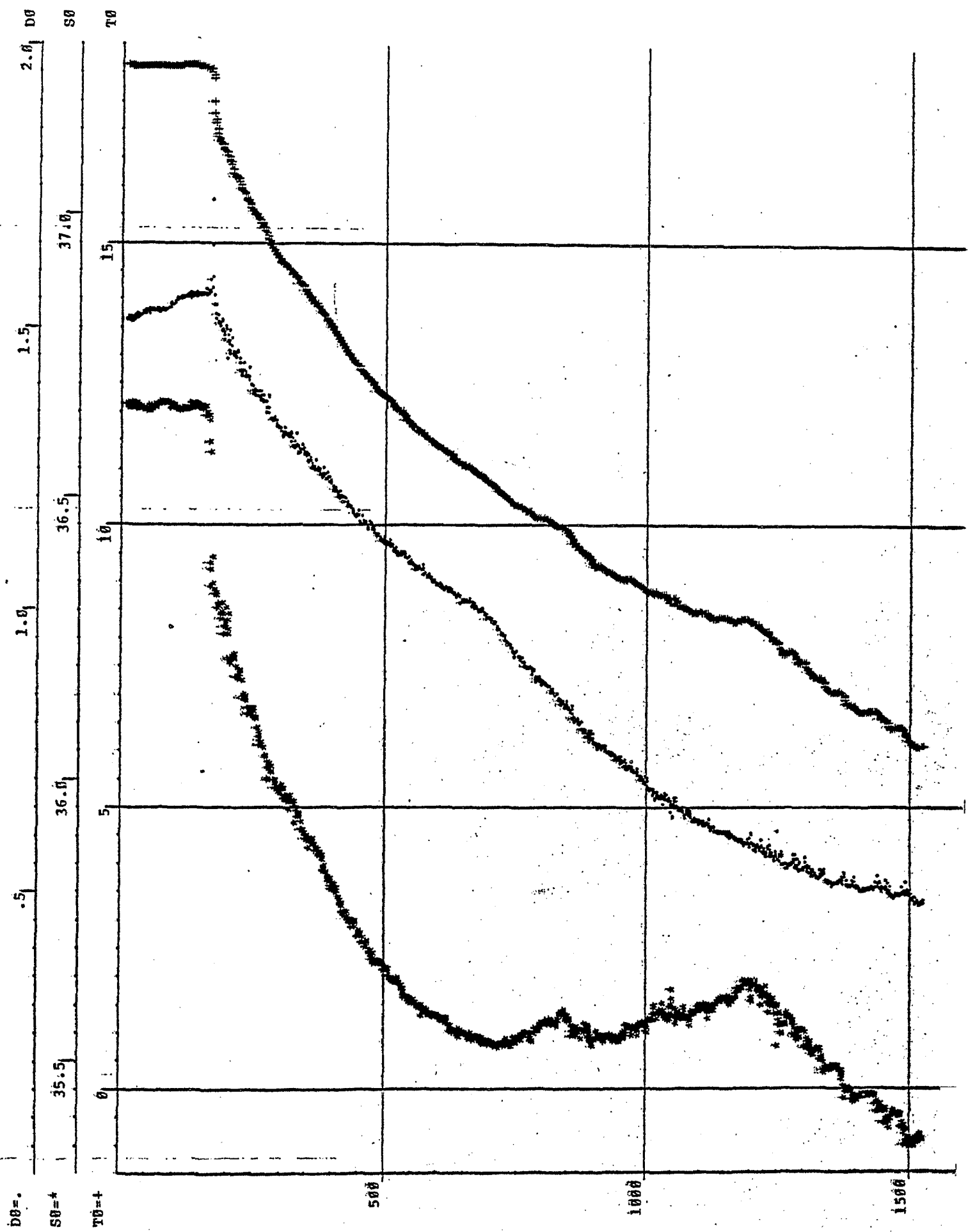
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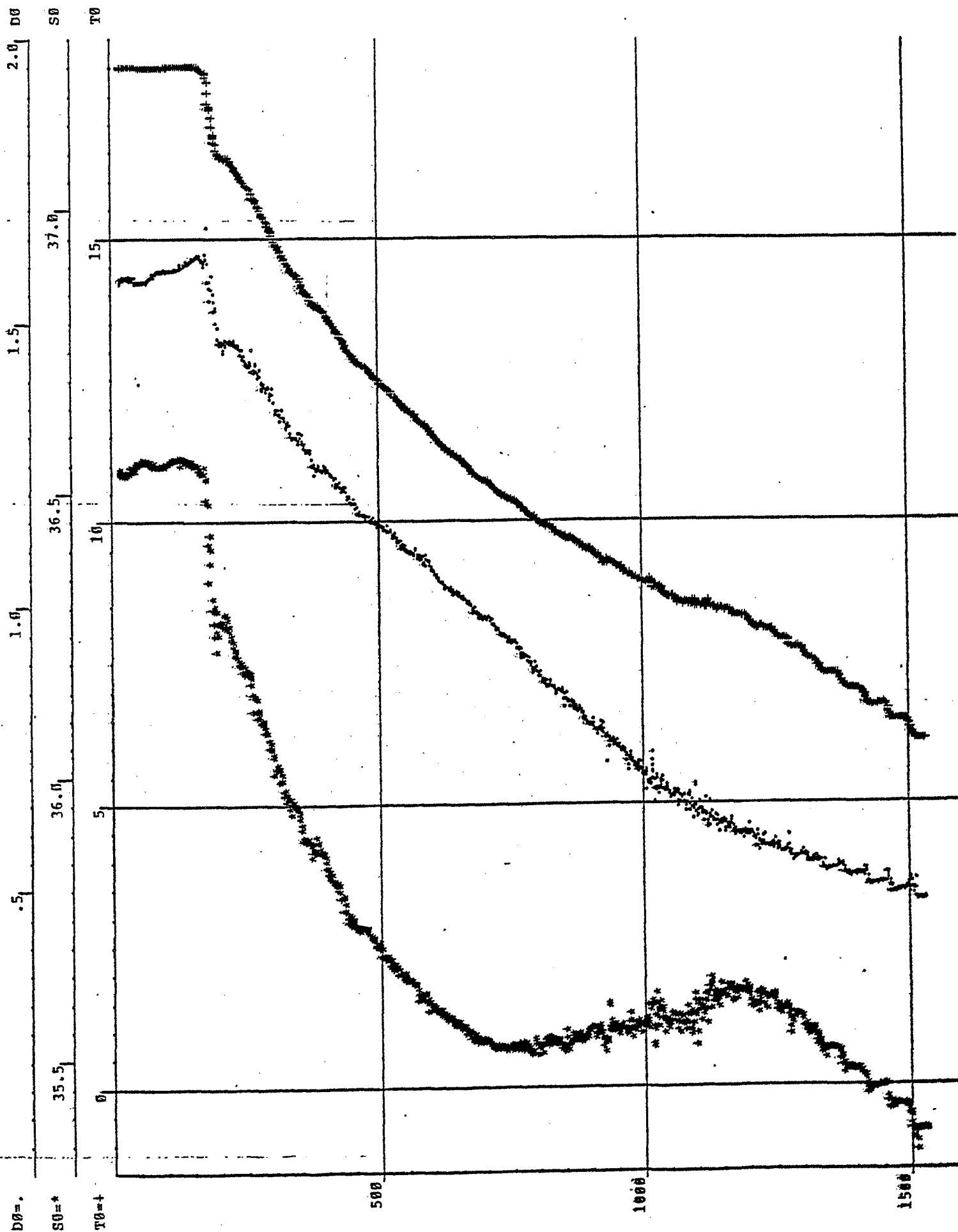
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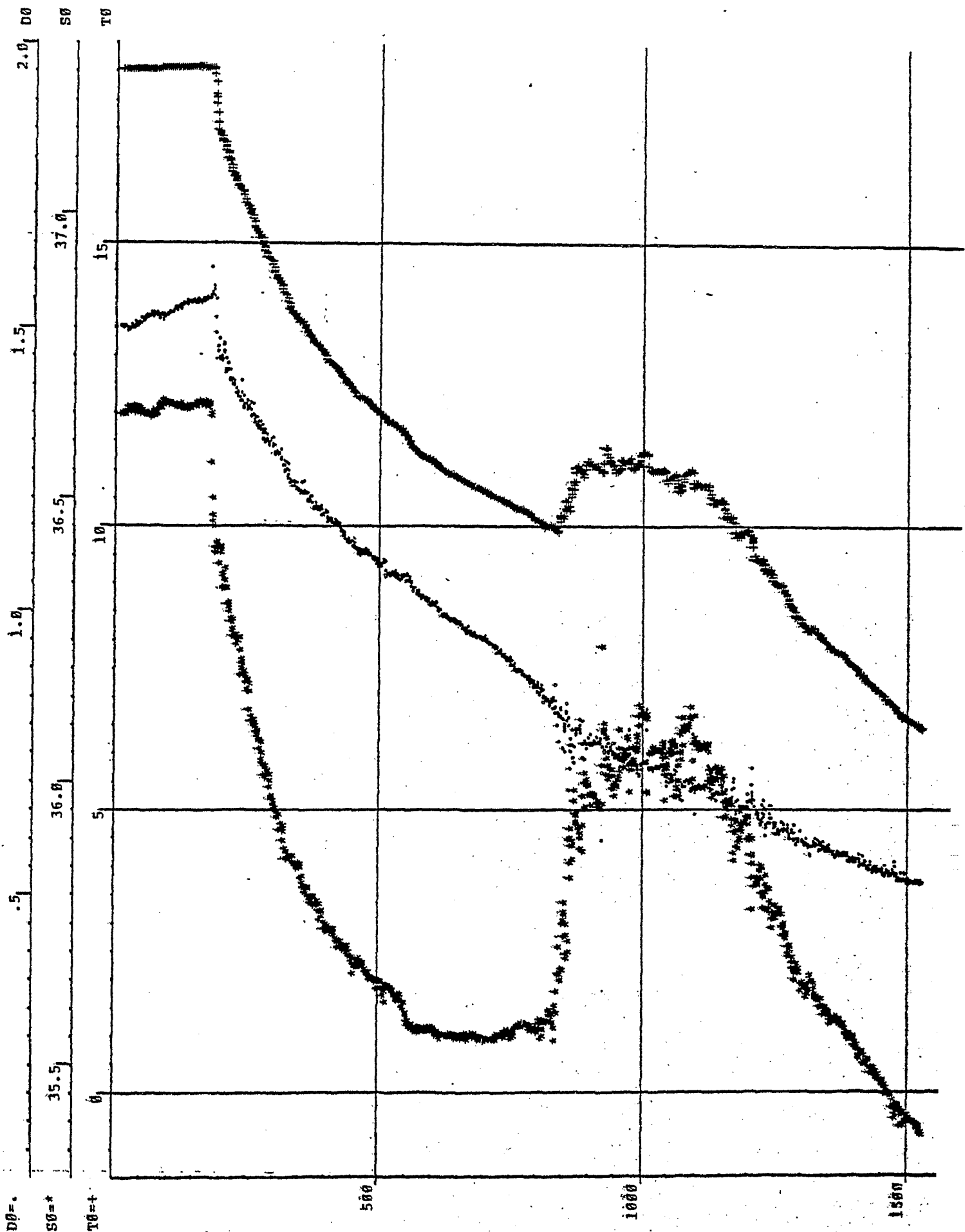
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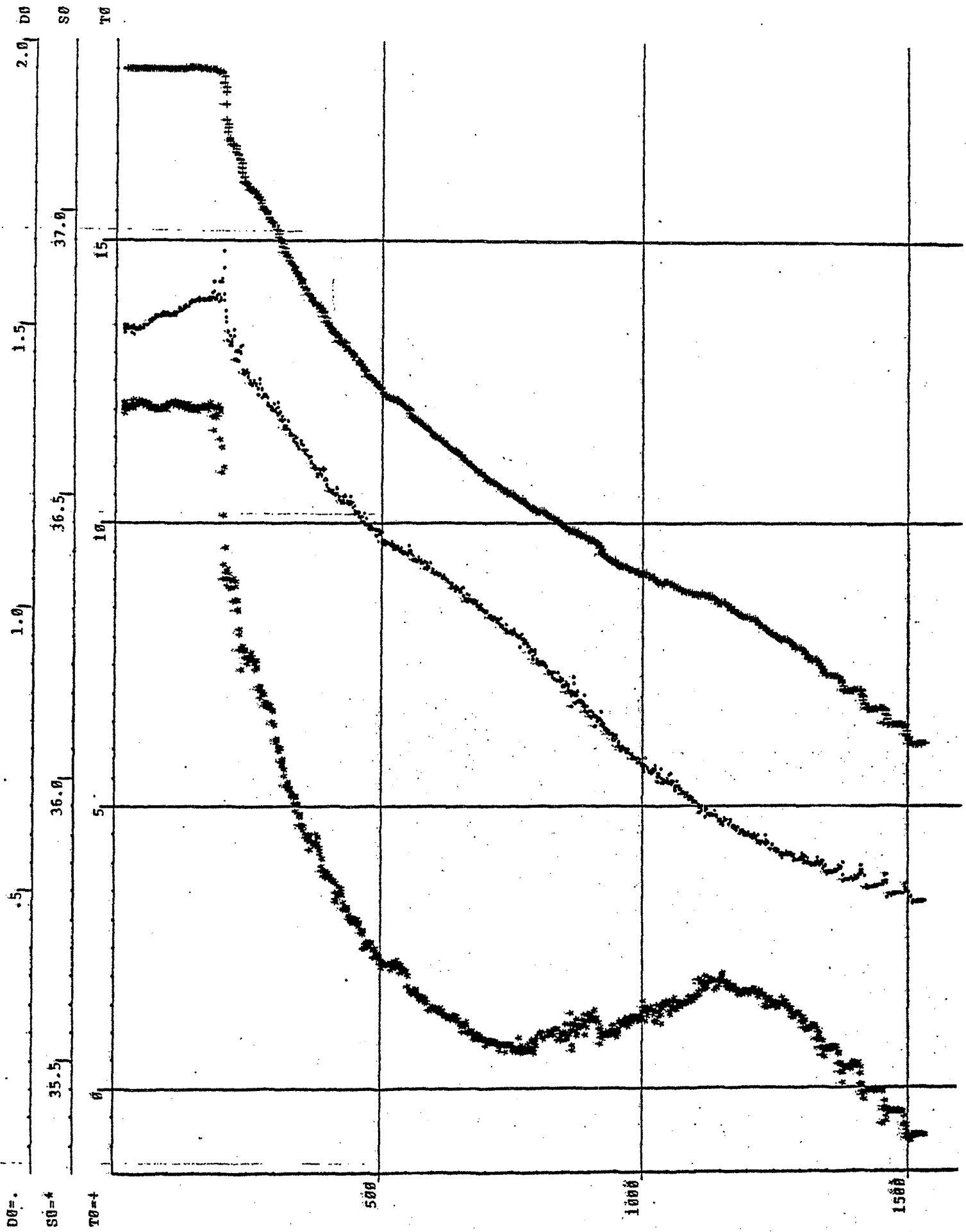
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POSEIDON 86 DATE: 31. 3.82 STATION: 280 PROFILE: 25



POSEIDON 86 DATE: 31. 3.82 STATION 71 PROFILE: 26

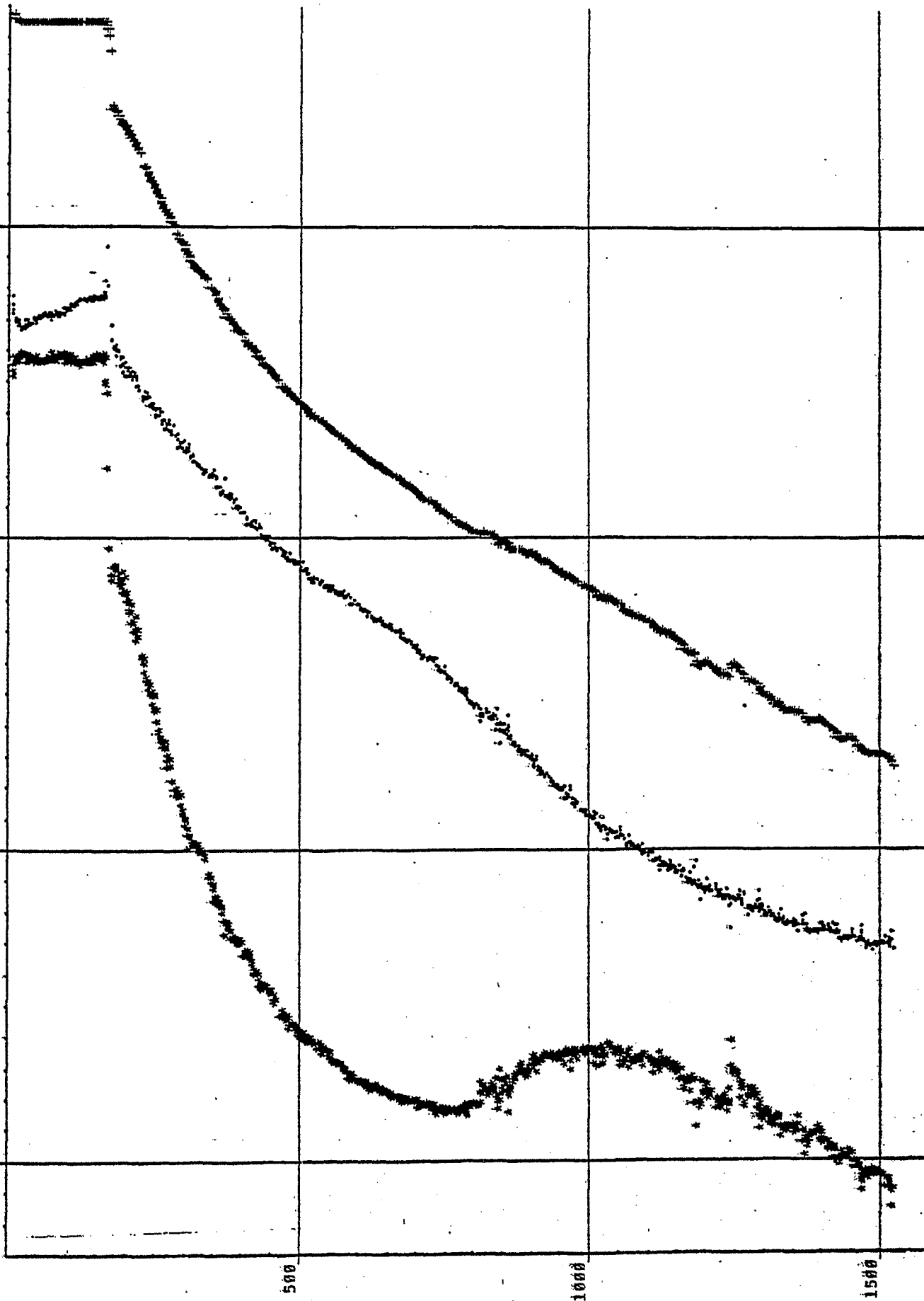


POSITION 86 DATE: 31. 3.82 STATIO. 202 PROFILE: 27

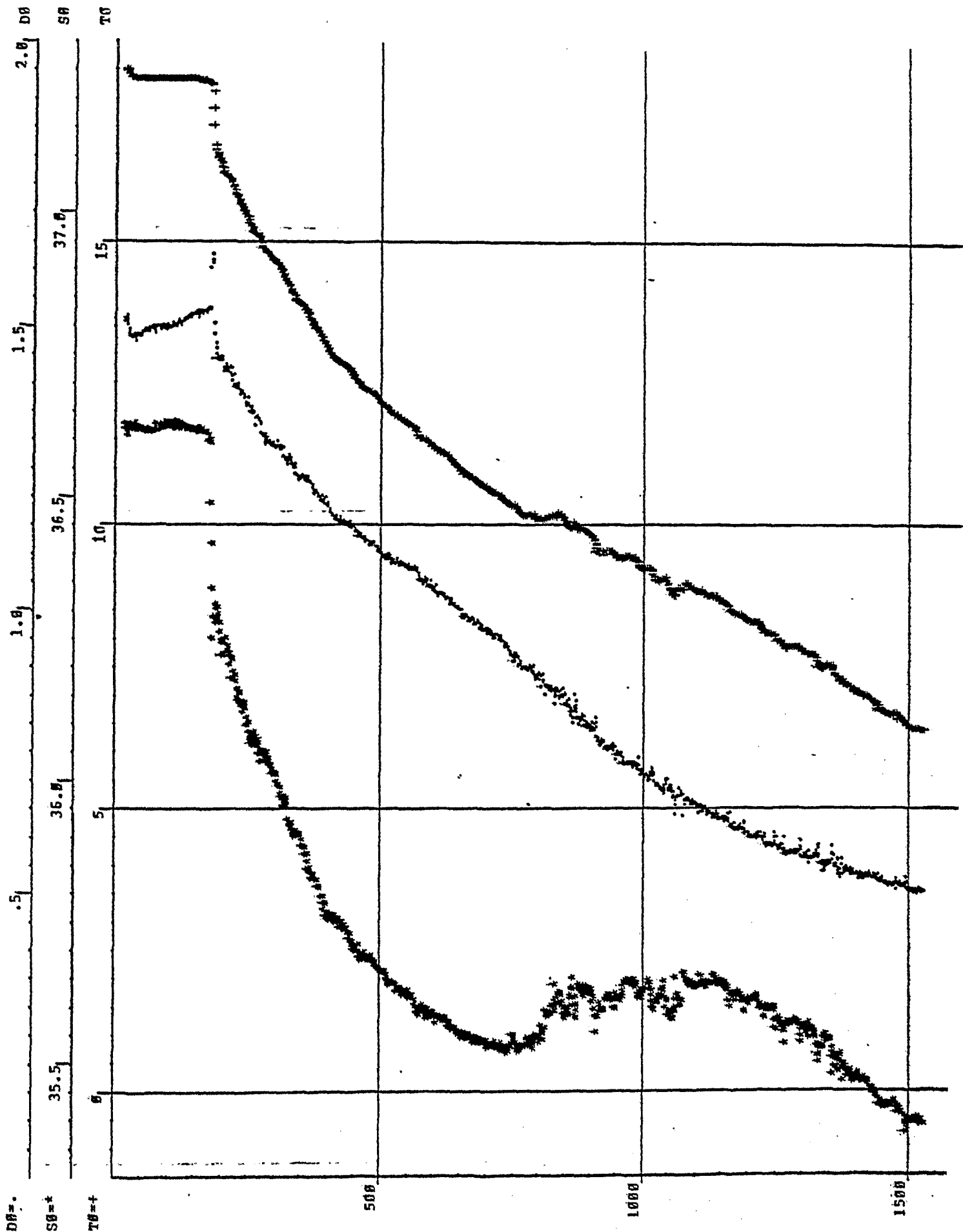
D0 = . 2.0 D0

S0 = * 35.5 37.0 S0

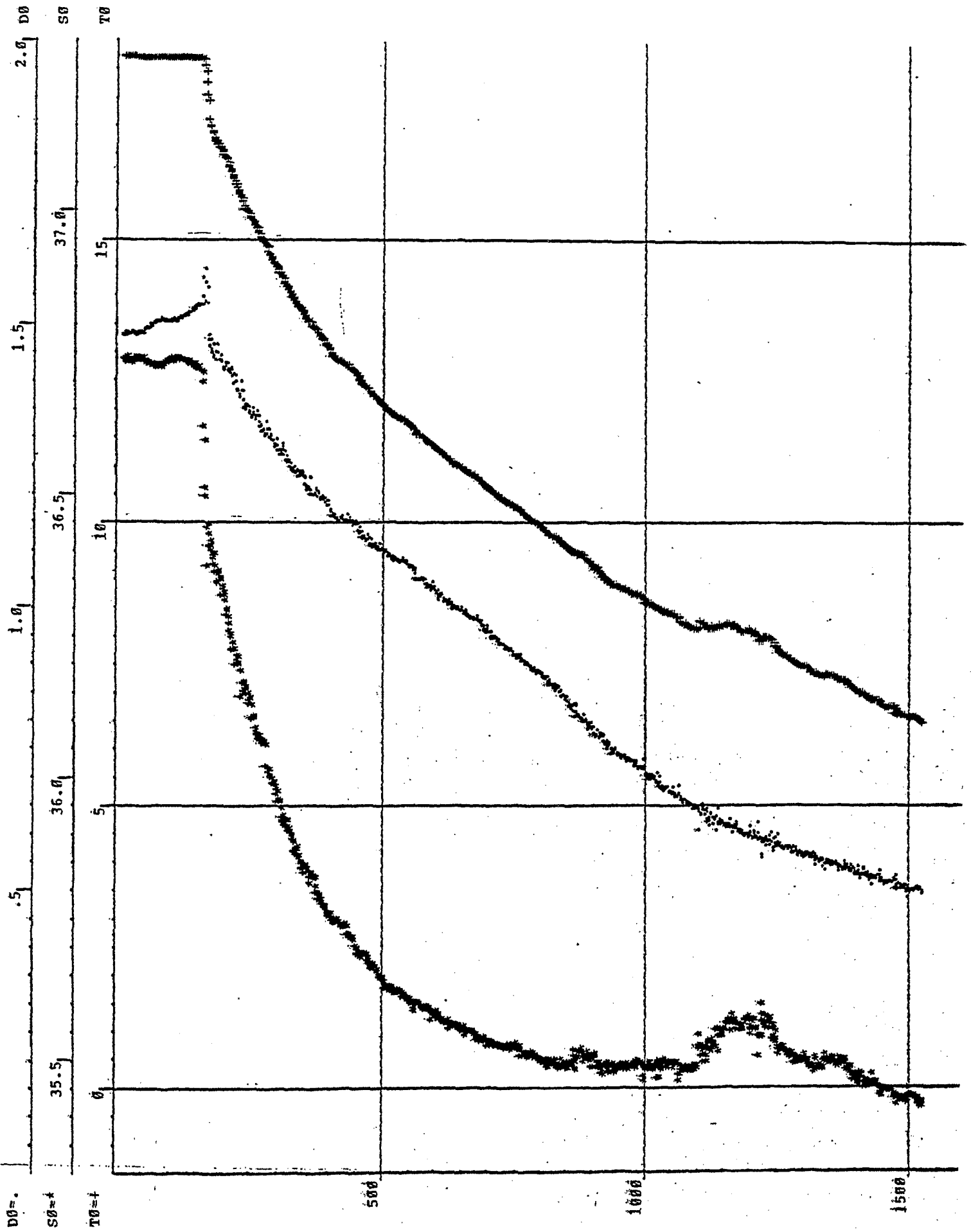
T0 = + 10 15 T0



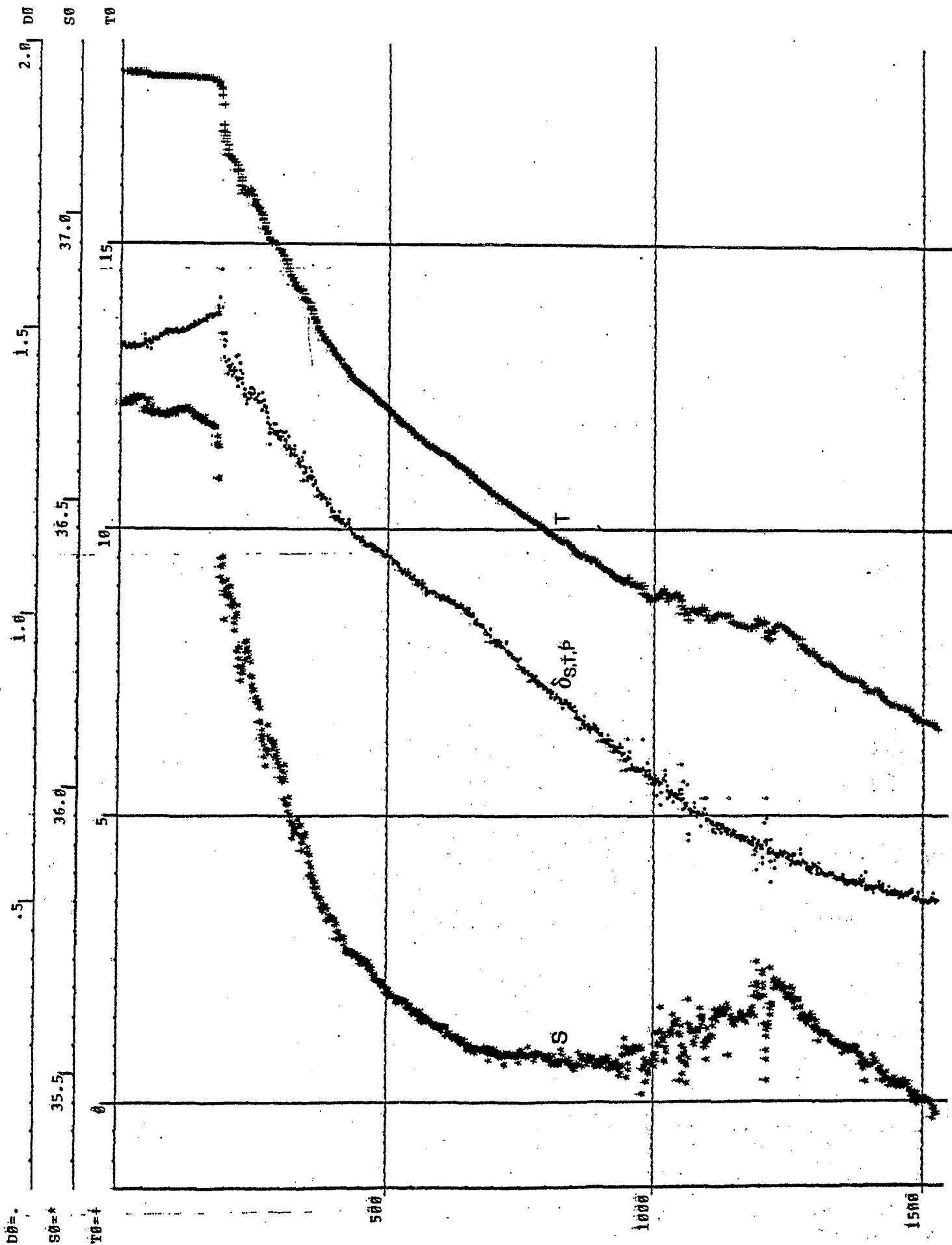
POSITION 86 DATE: 31. 3.82 STATION: 28 PROFILE: 28



POSEIDON 86 DATE: 1. 4.82 STATION 204 PROFILE: 29

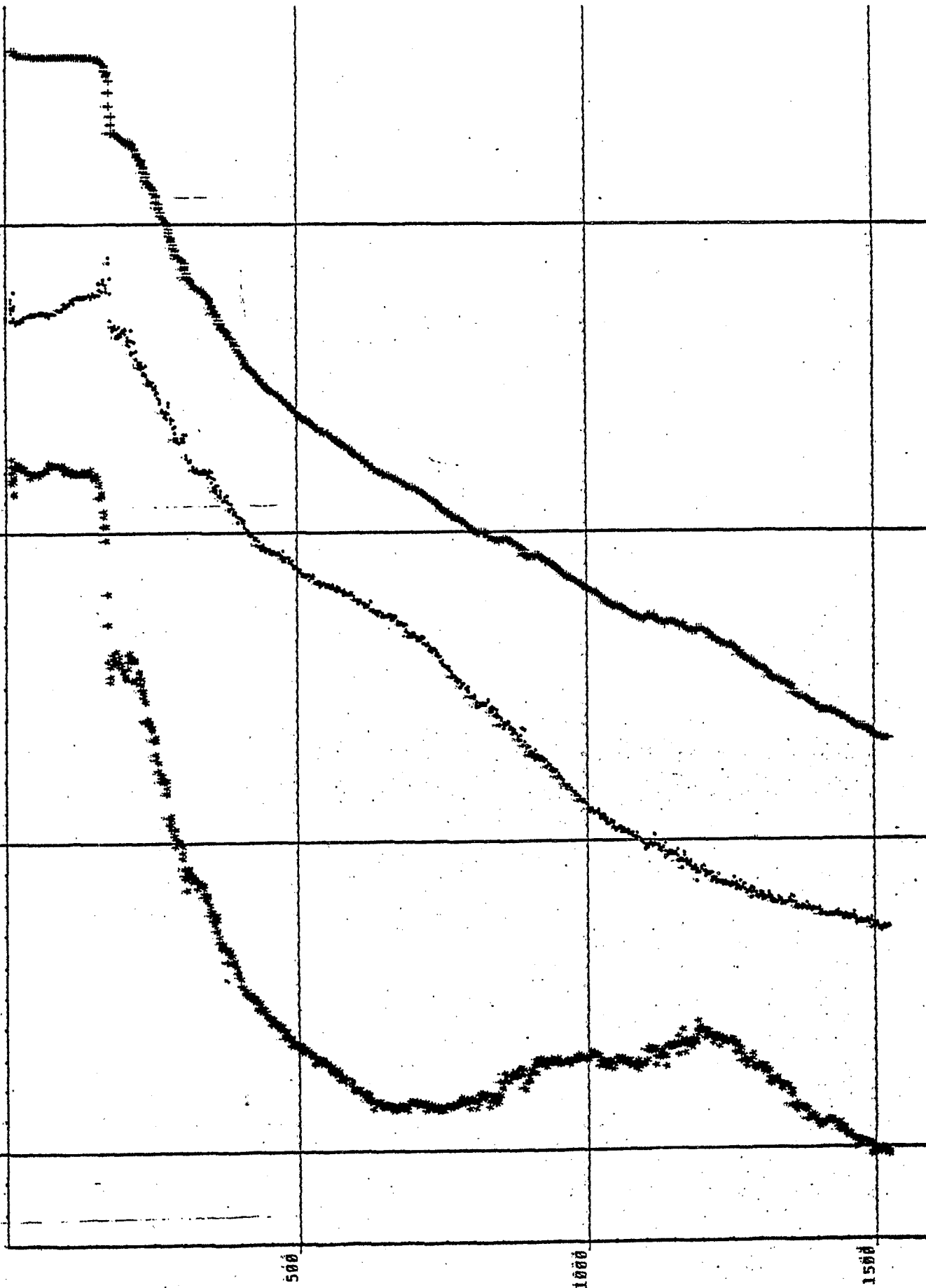


POSEIDON 86 DATE: 1. 4.82 STATION: 285 PROFILE: 30

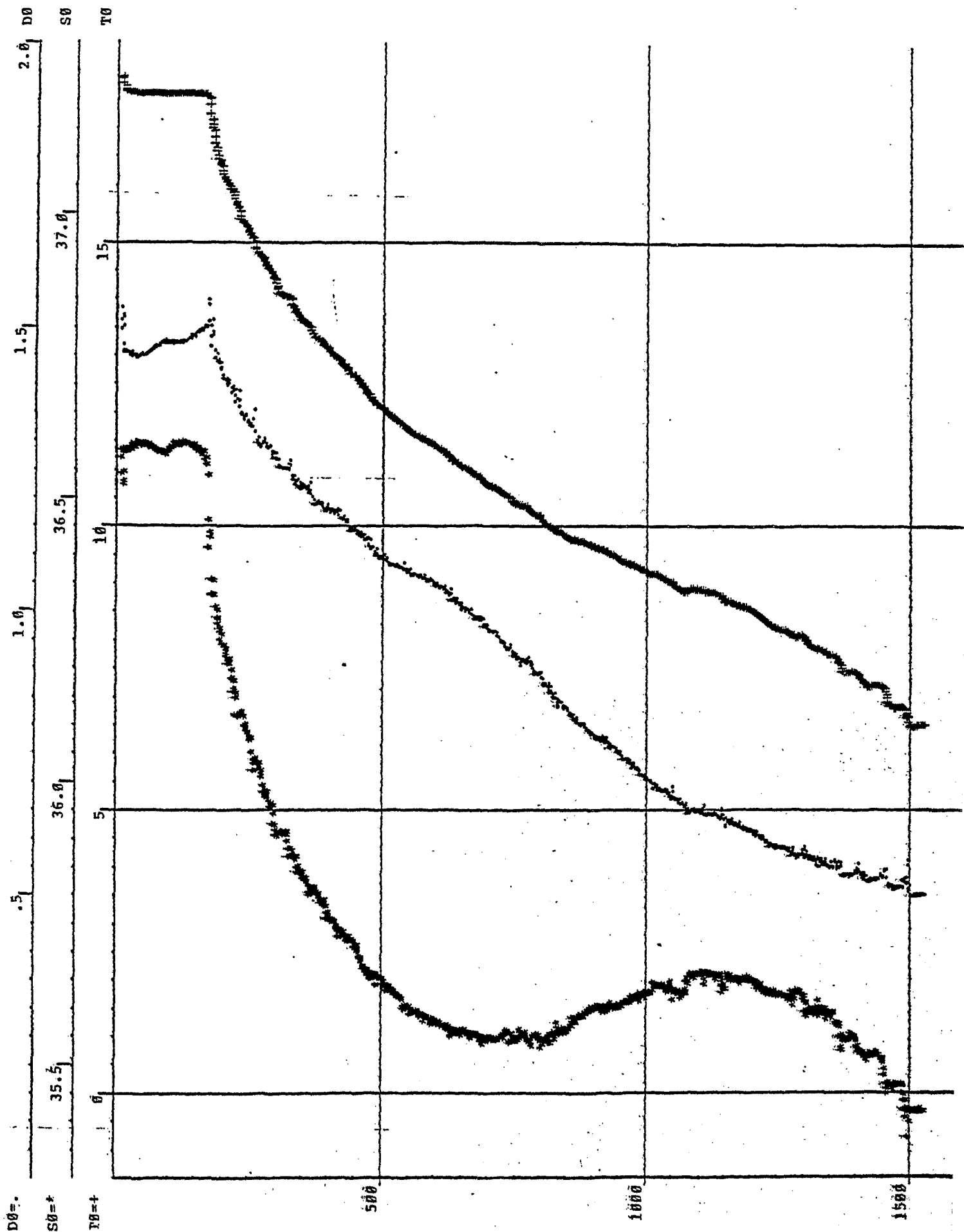


POSICIÓN 86 DATE: 1. 4.82 STATION 36 PROFILE: 31

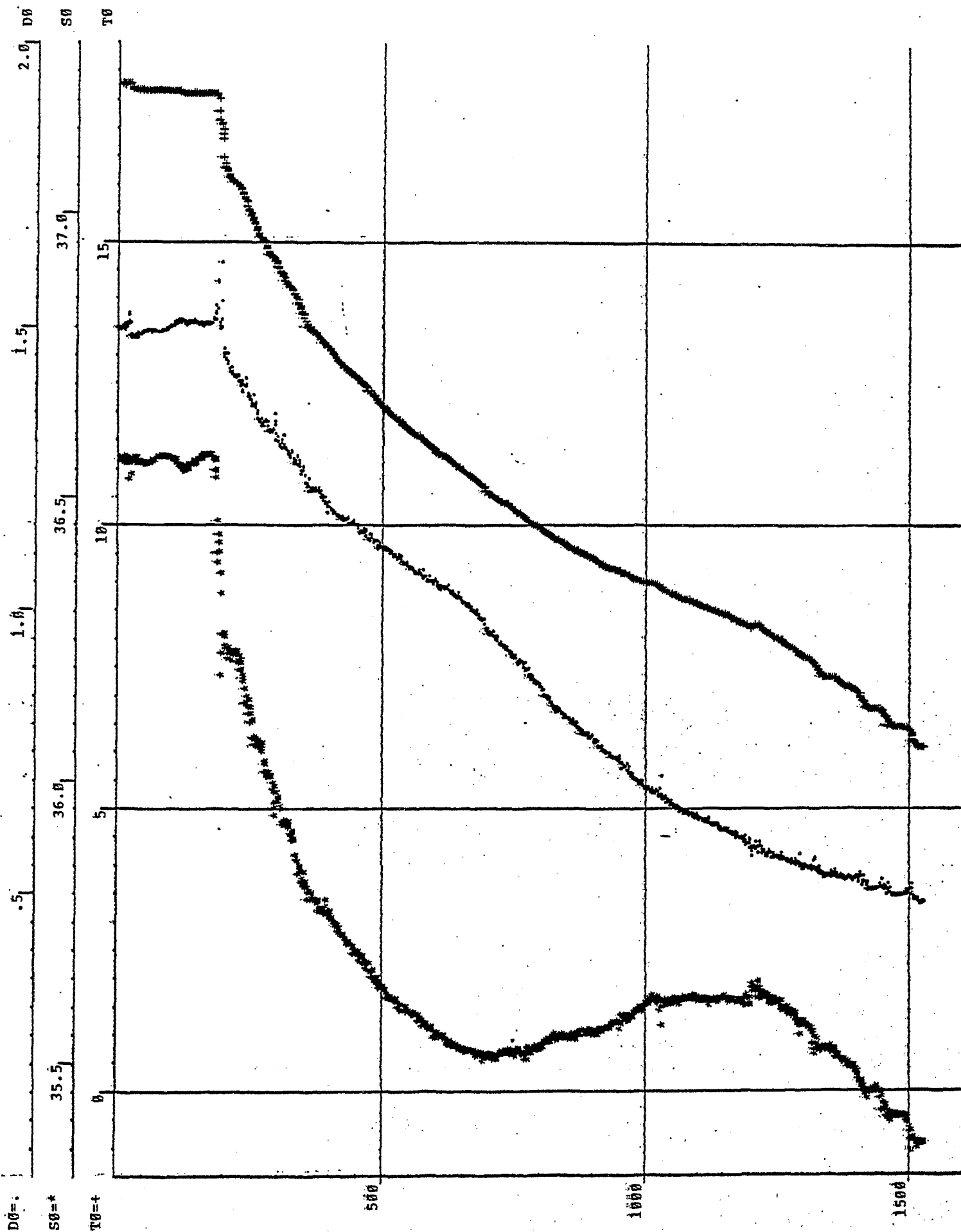
DO= .5 1.0 1.5 2.0 b0
S0= 35.5 36.0 36.5 37.0 S0
T0= 0 5 10 15 T0



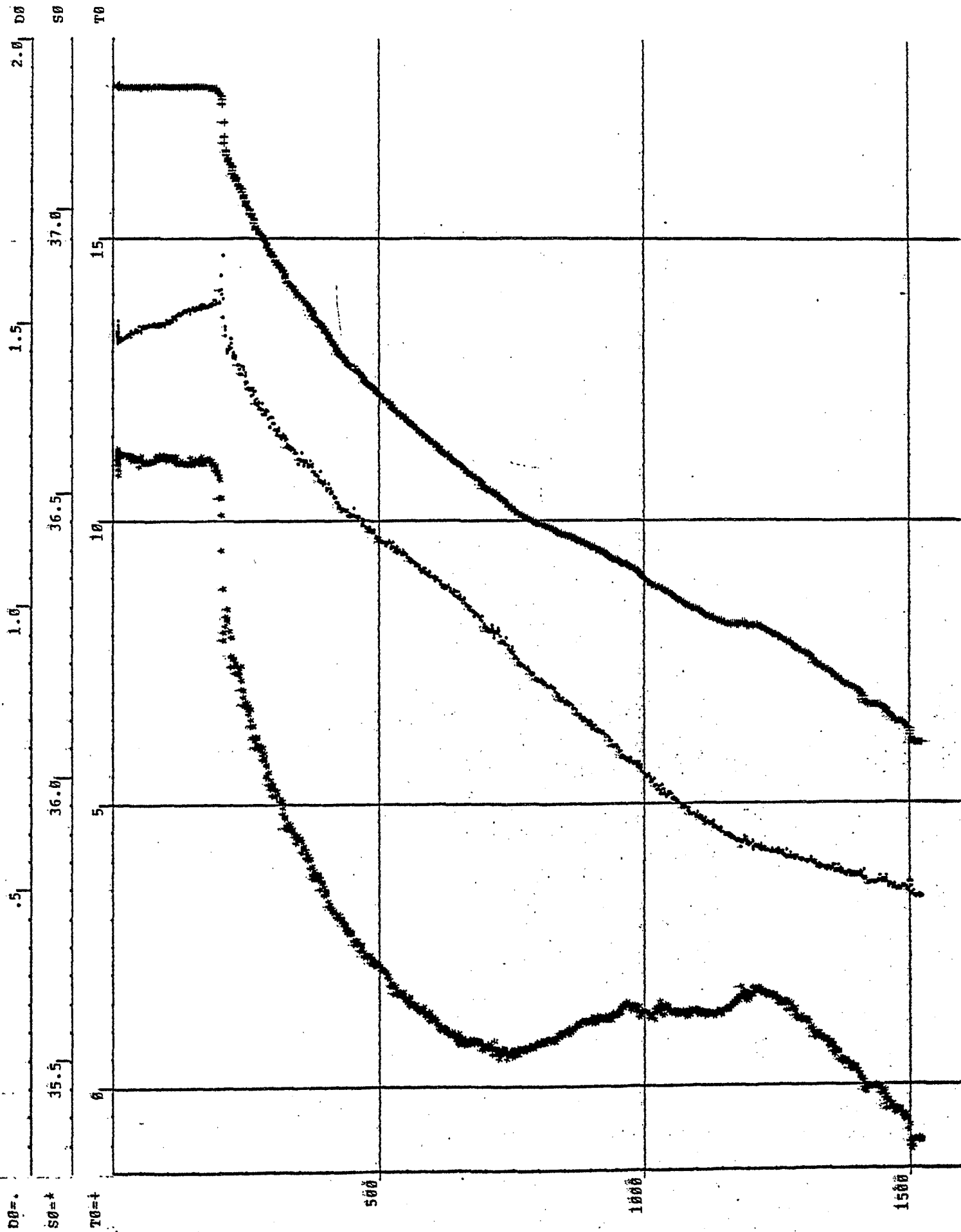
POSITION 86 DATE: 1. 4.82 STATION: 37 PROFILE: 32



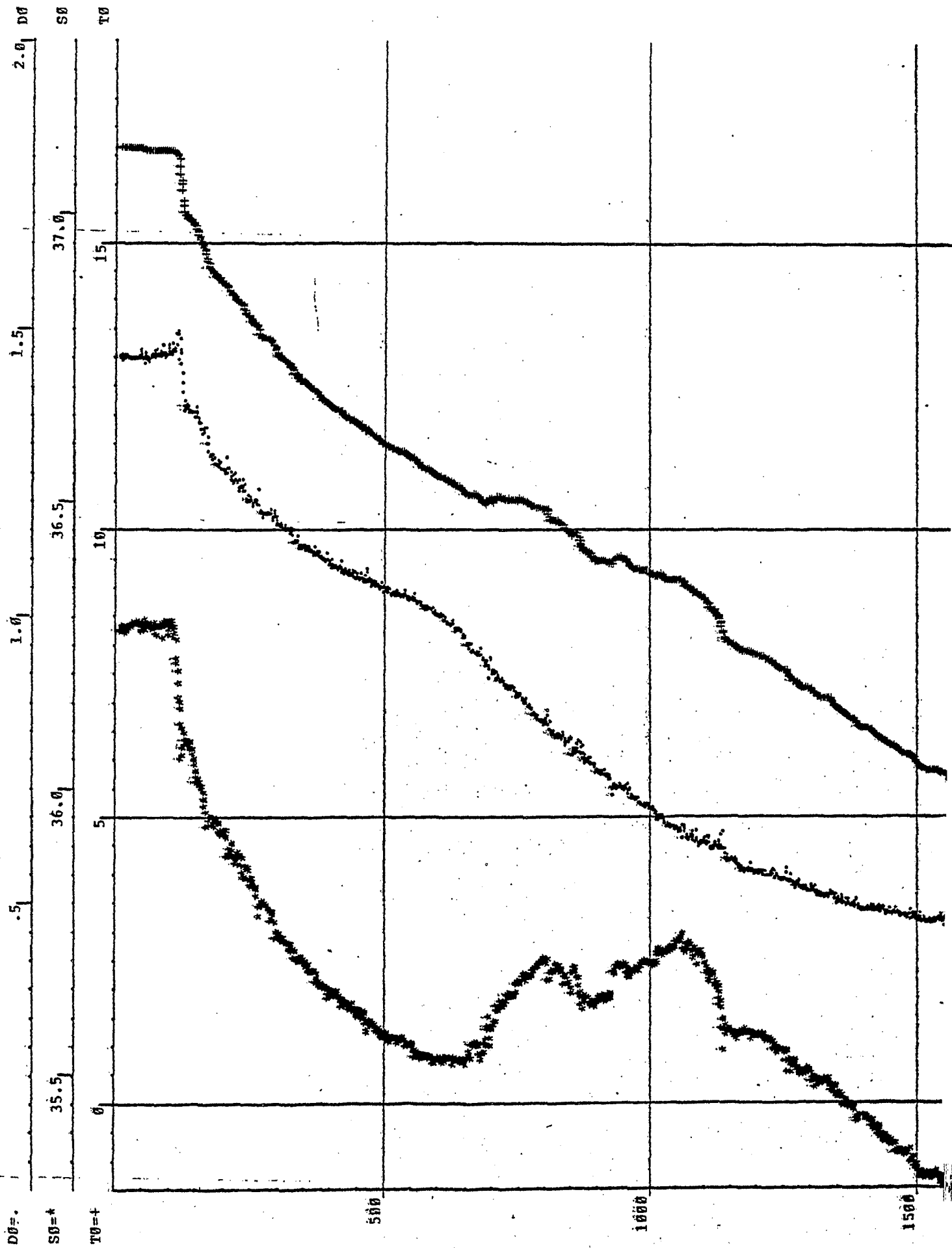
POSEIDON S6 DATE: 1. 4.82 STATION: 288 PROFILE: 33



POSEIDON 86 DATE: 2. 4.82 STATION: 289 PROFILE: 34



POSEIDON 86 DATE: 4. 2.82 STATION: 290 PROFILE: 35

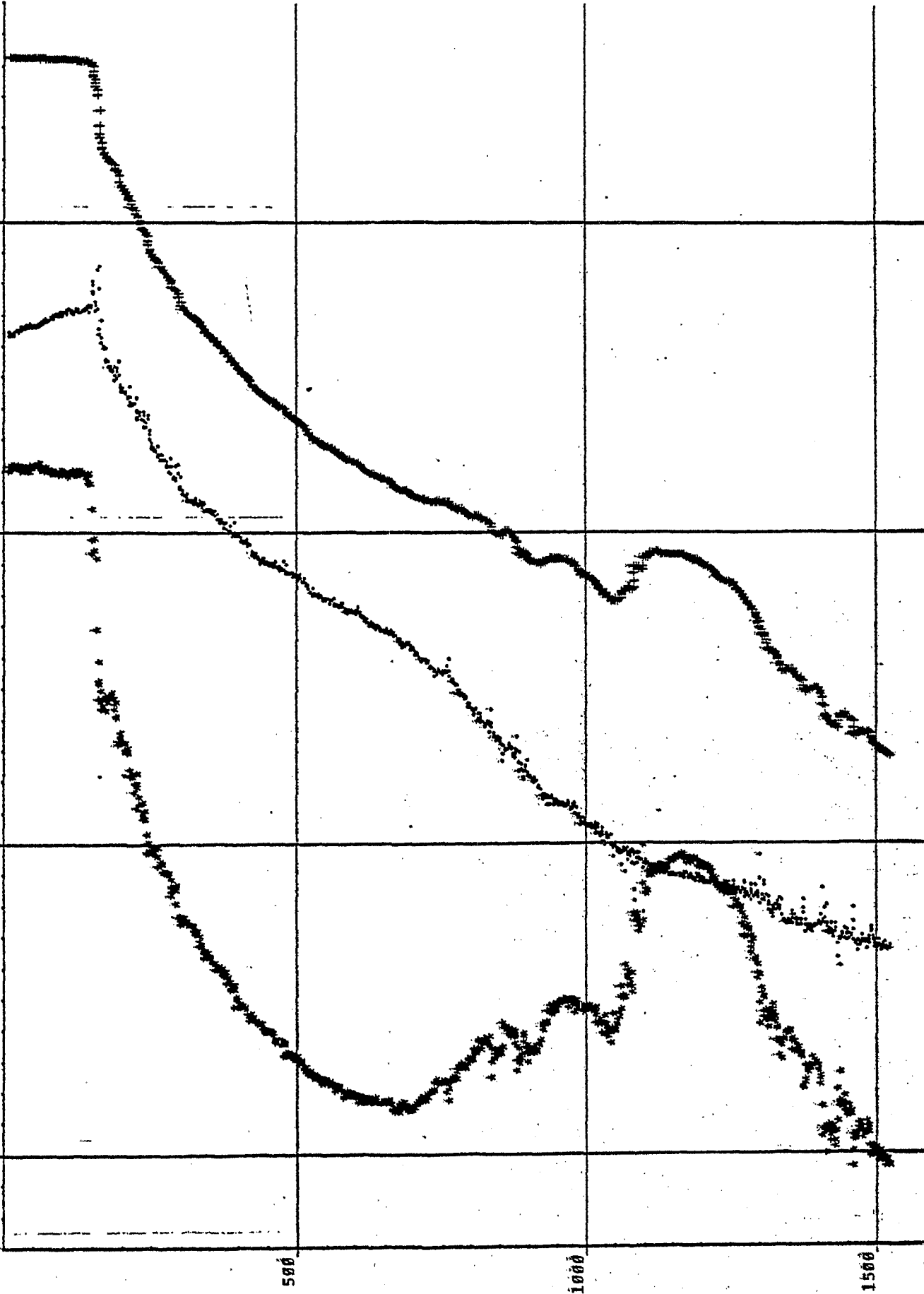


POSEIDON 86 DATE: 2. 4.82 STATION: 91 PROFILE: 36

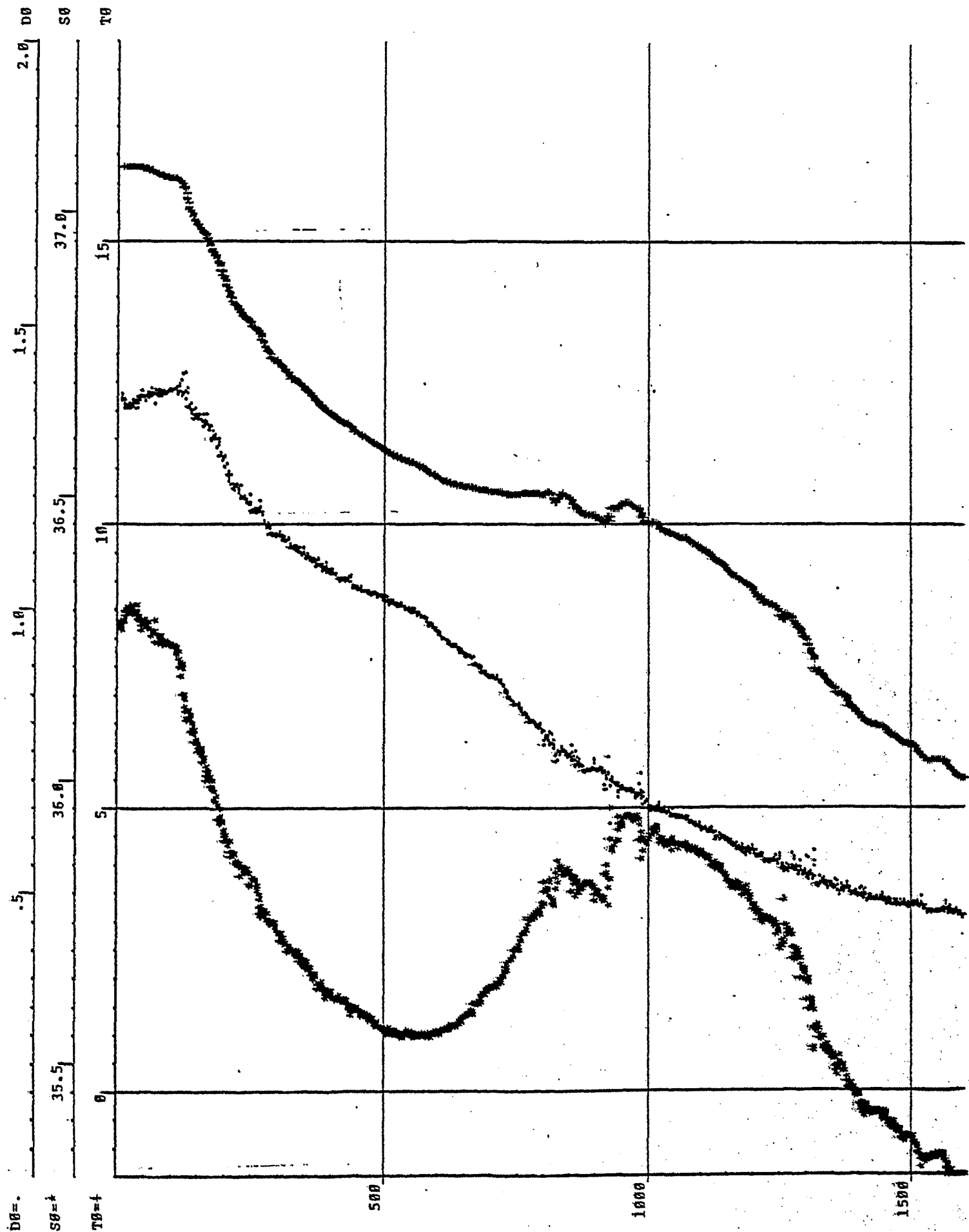
D0 = 2.0 D0

S0 = 35.5 36.0 36.5 37.0 S0

T0 = 0 5 10 15 T0



POSEIDON 86 DATE: 2. 4.82 STATION: 392 PROFILE: 37

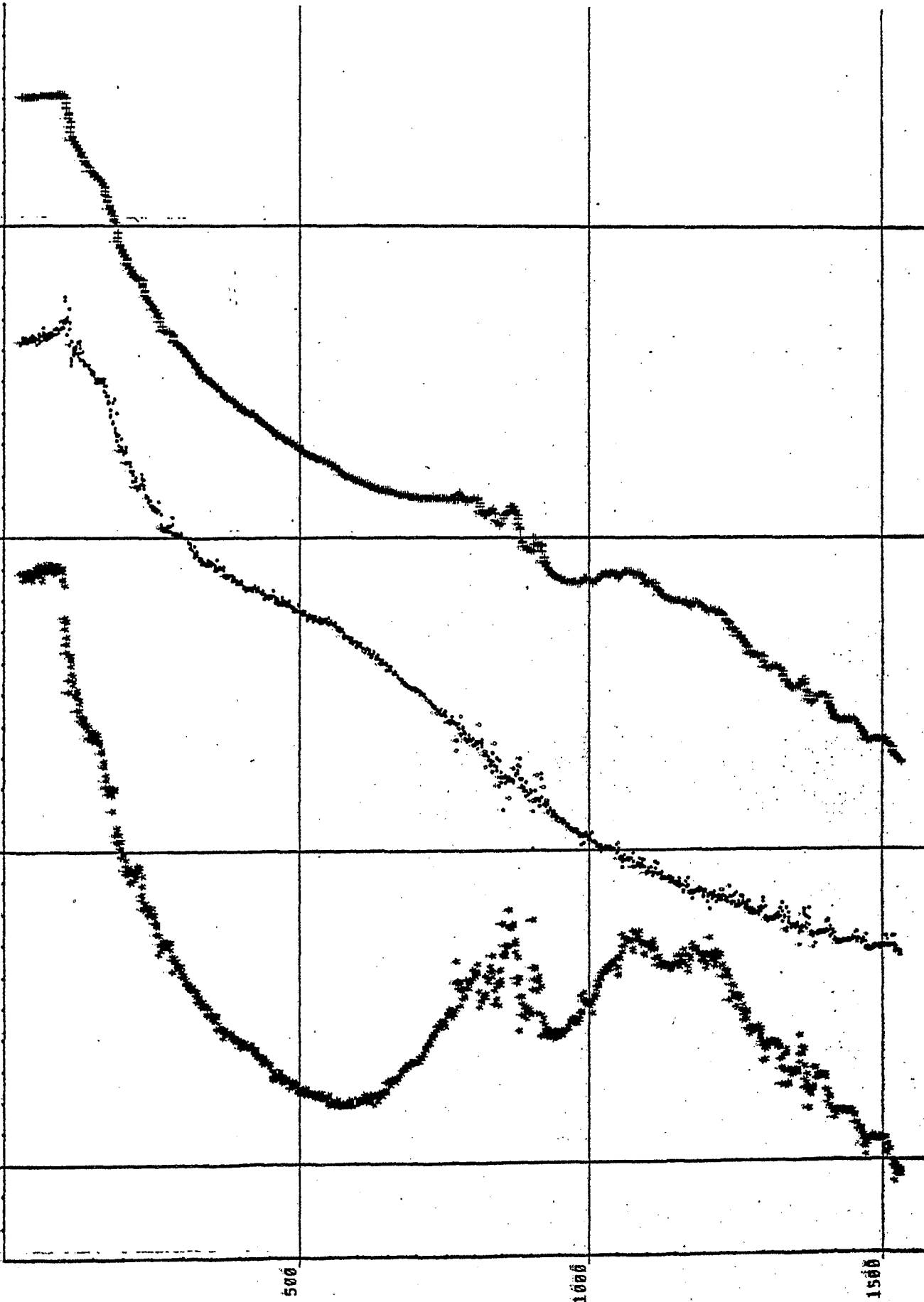


POSEIDON 86 , DATE: 3. 4.82 STATION 33 PROFILE: 38

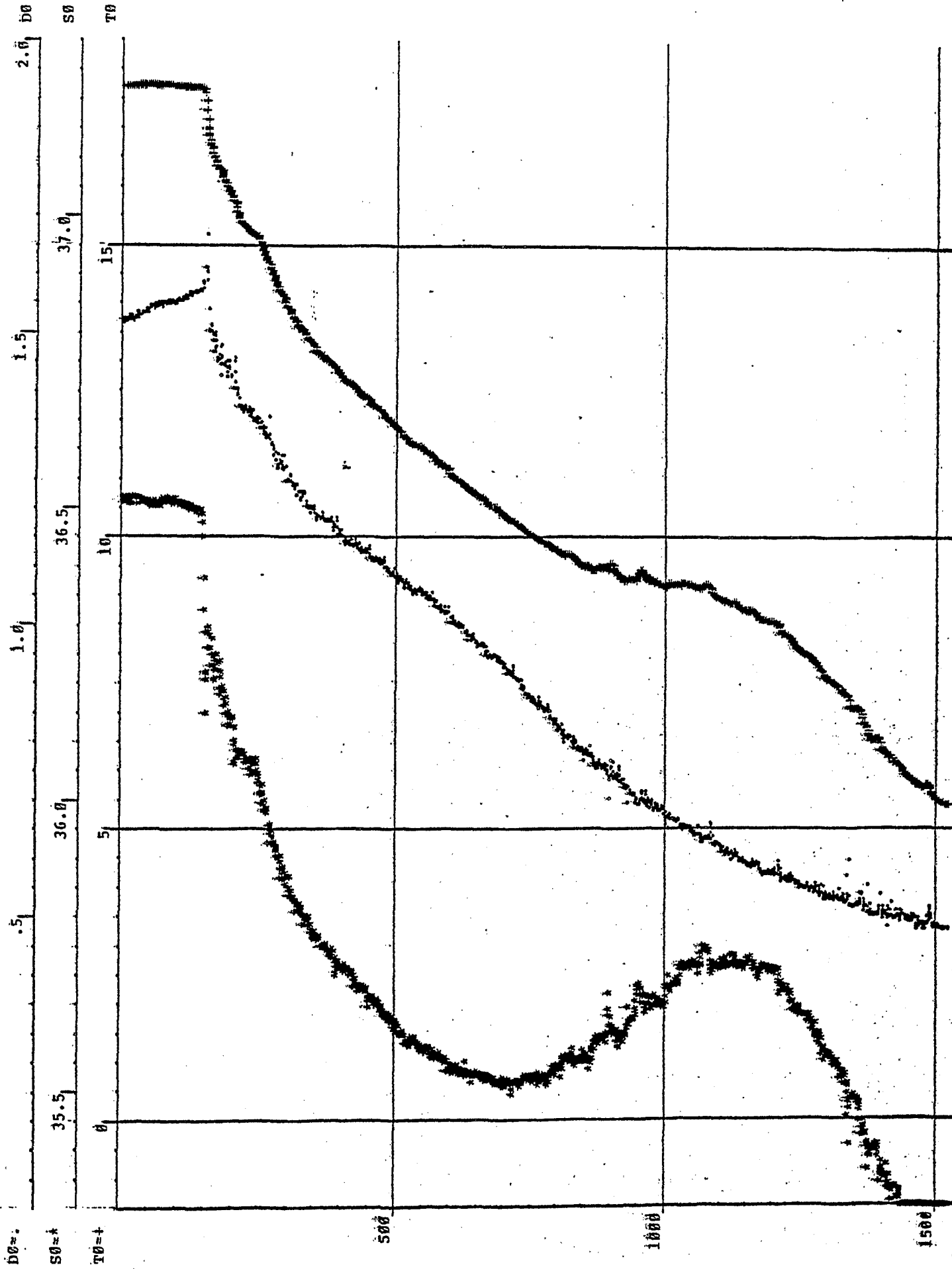
D0= . 0.5 1.0 1.5 2.0 D0

S0= 35.5 36.0 36.5 37.0 S0

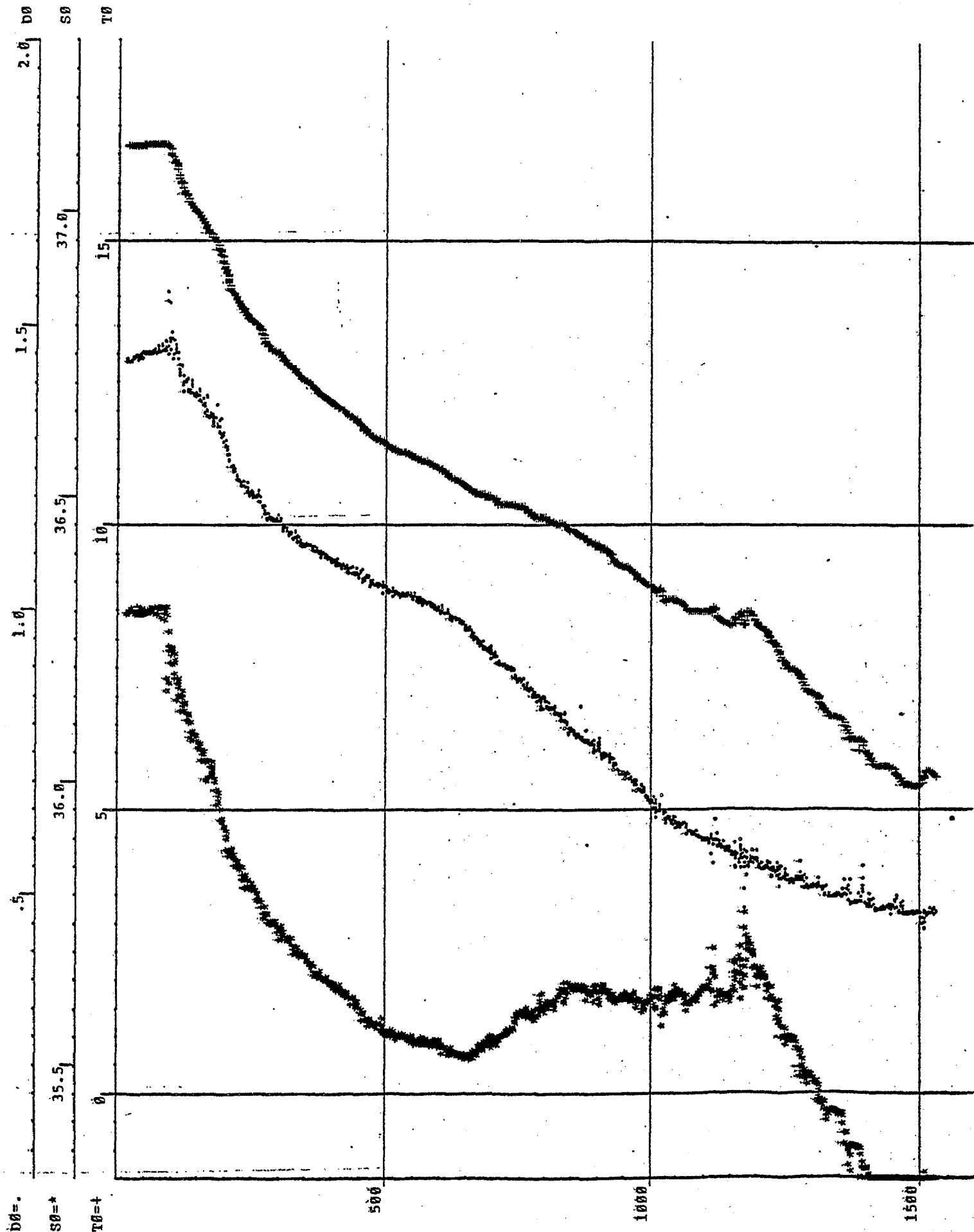
T0= 0 5 10 15 20 T0



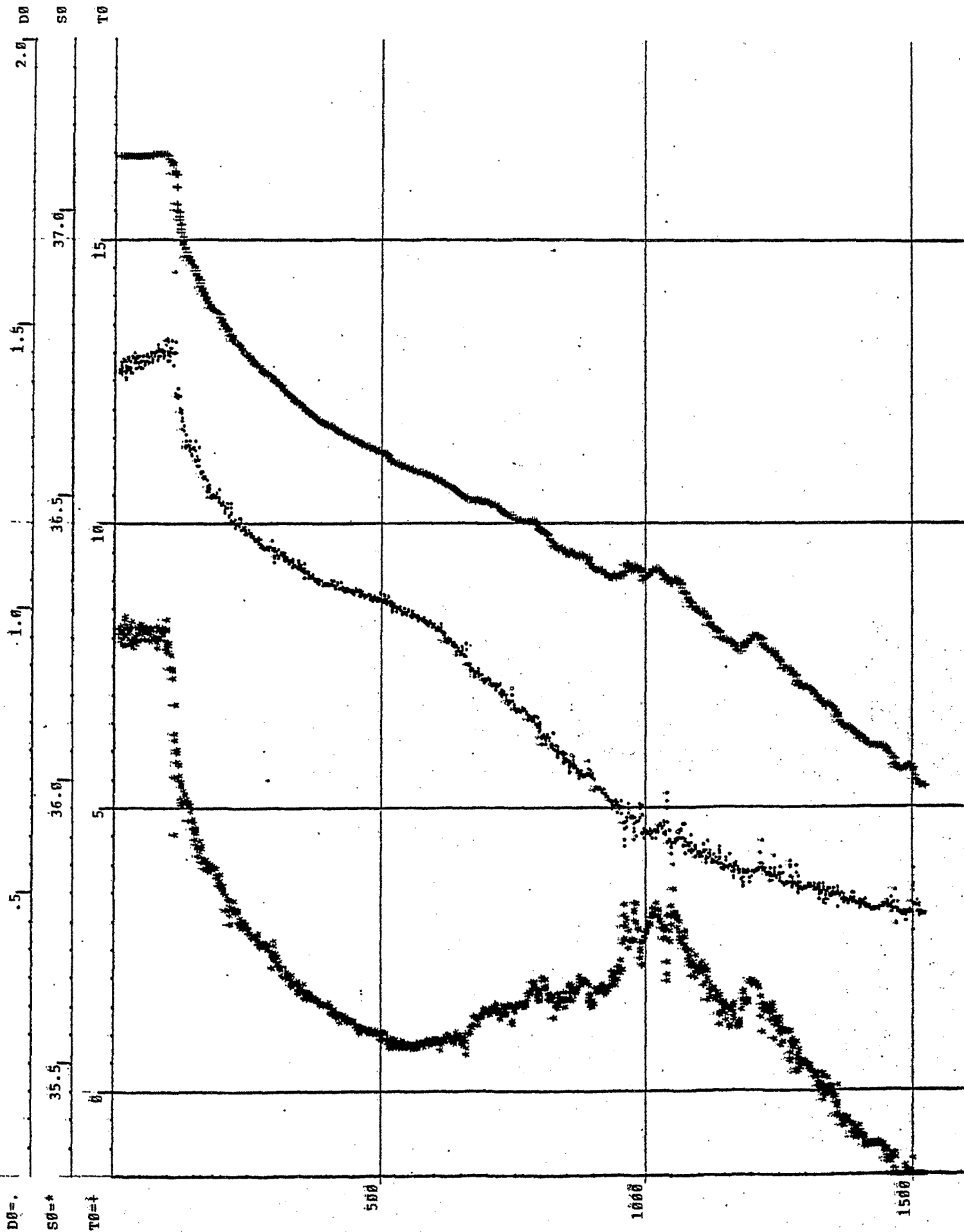
POSEIDON 86 DATE: 3. 4.82 STATION: 295 PROFILE: 39



POSICIÓN 66 DATE: 4. 4.62 STATION: 296 PROFILE: 40



POSITION 86 DATE: 4. 4.82 STATION: 297 PROFILE: 41

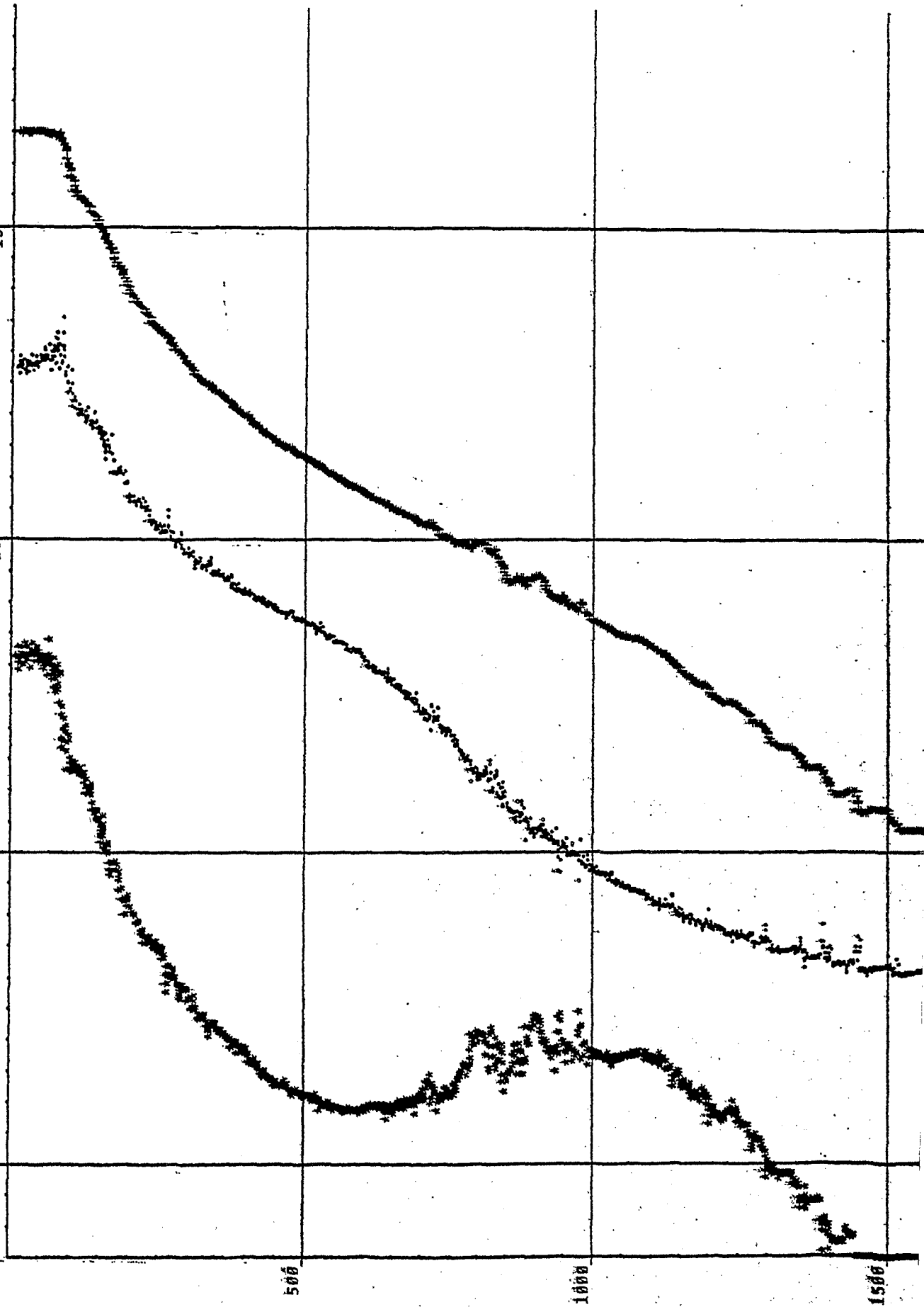


POSEIDON 86 DATE: 4. 4.82 STATION: 298 PROFILE: 42

D0=. 35.5 36.0 36.5 37.0 2.0 D0

S0=* 35.5 36.0 36.5 37.0 S0

T0=+ 0 5 10 15 T0

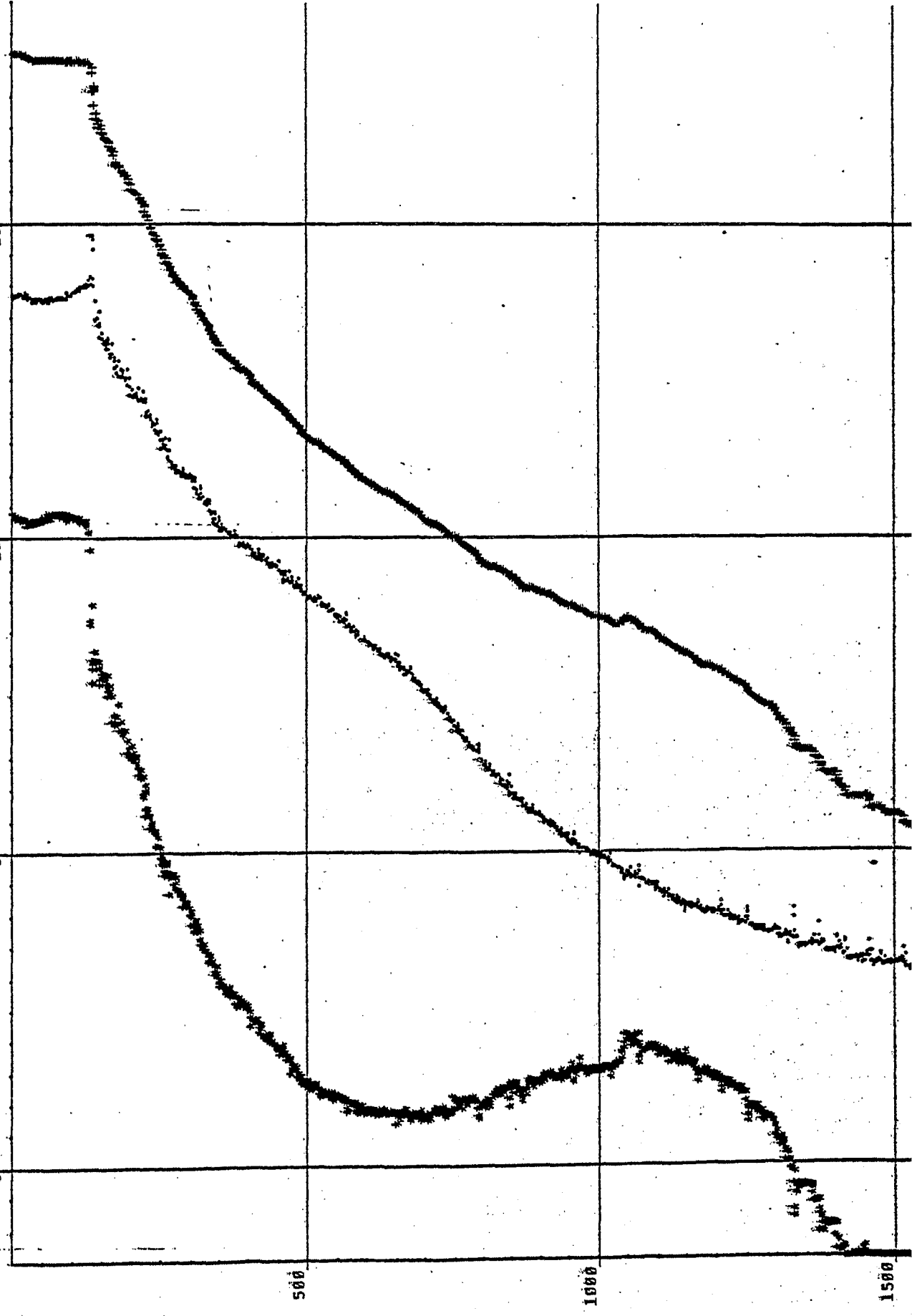


POSEIDON 86 DATE: 4. 4.82 STATION: 299 PROFILE: 43

D0=. 2.0 D0

S0=* 35.5 36.0 36.5 37.0 S0

T0=+ 0 5 10 15 T0

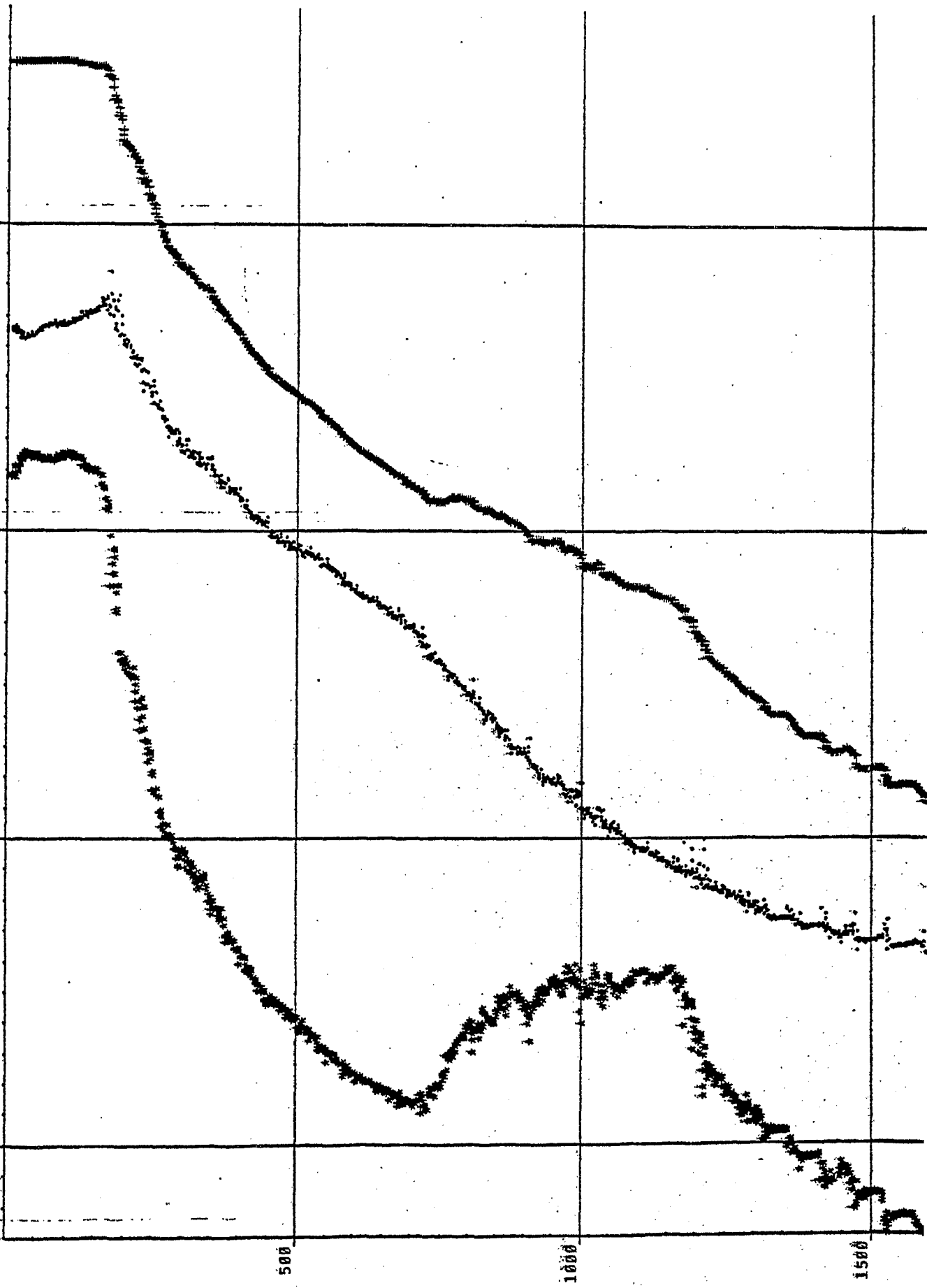


POSEIDON 86 DATE: 4. 4.82 STATION 36 PROFILE: 44

D0=. 2.0 1.5 1.0 .5

S0=+ 35.5 36.0 36.5 37.0

T0=+ 0 5 10 15

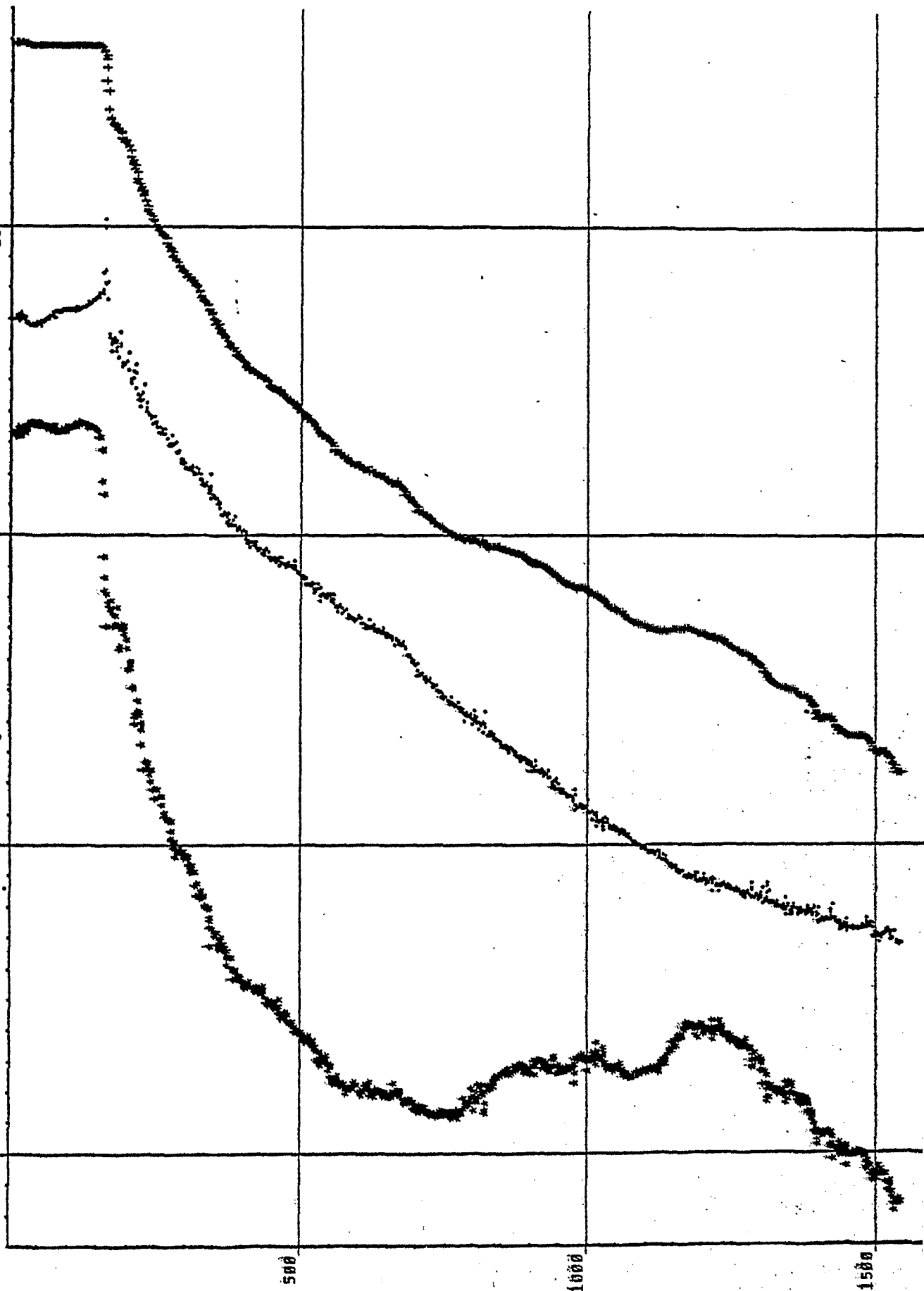


POSEIDON 86 DATE: 5. 4.82 STATIC 801 PROFILE: 45

DB=. 1.0 1.5 2.0 DB

SB=* 35.5 36.0 36.5 37.0 SB

TB=+ 0 5 10 15 20 TB

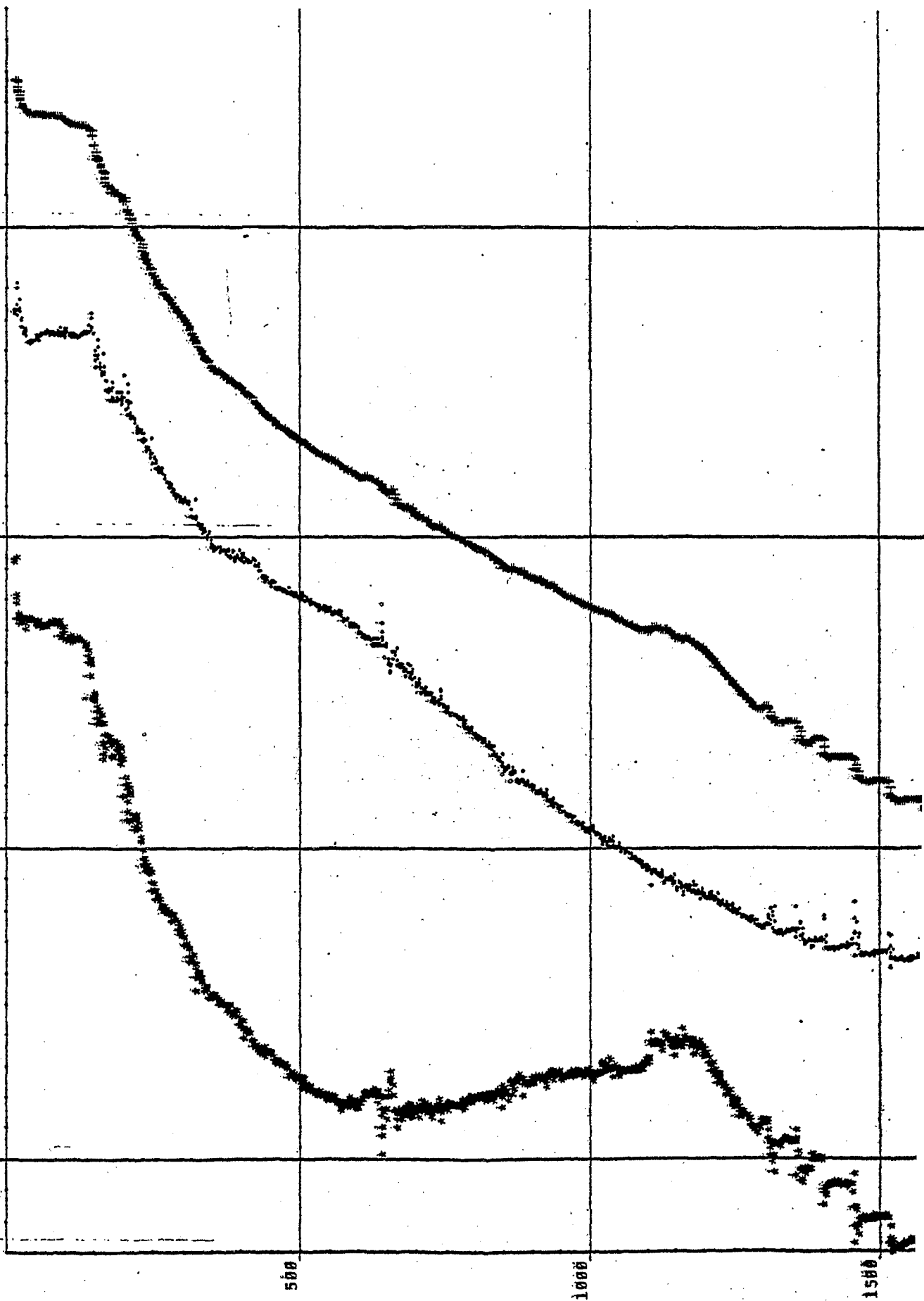


POSEIDON 86 DATE: 5. 4.82 STATION: 2 PROFILE: 46

Dθ=. 35.5 1.0 1.5 2.0 Dθ

Sθ=* 36.0 36.5 37.0 Sθ

Tθ=+ 0 5 10 15 Tθ

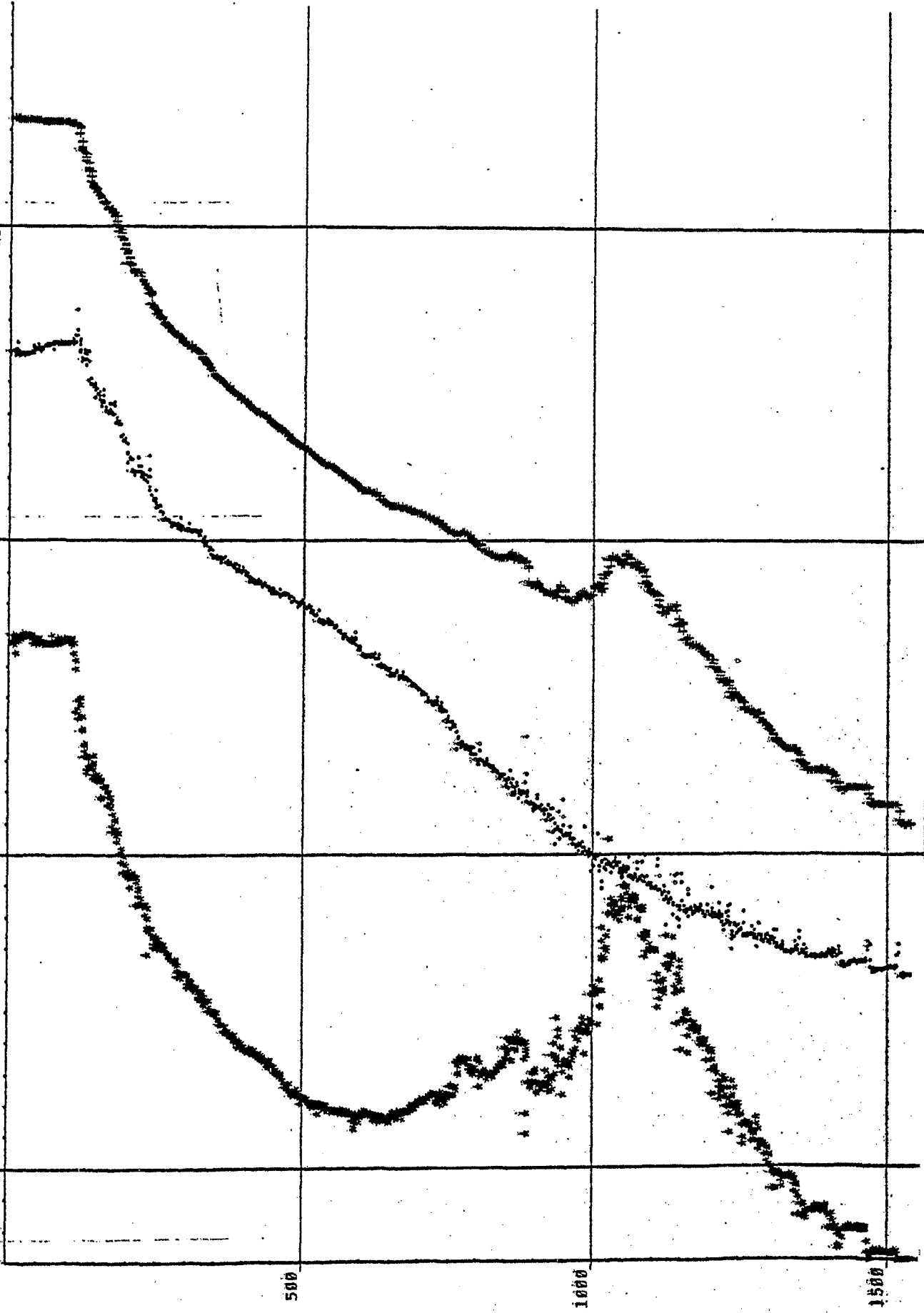


POSEIDON 86 DATE: 5. 4.82 STATION: 303 PROFILE: 47

D0=, 2.0 D0

S0=+ 35.5 36.0 36.5 37.0 S0

T0=+ 0 5 10 15 T0

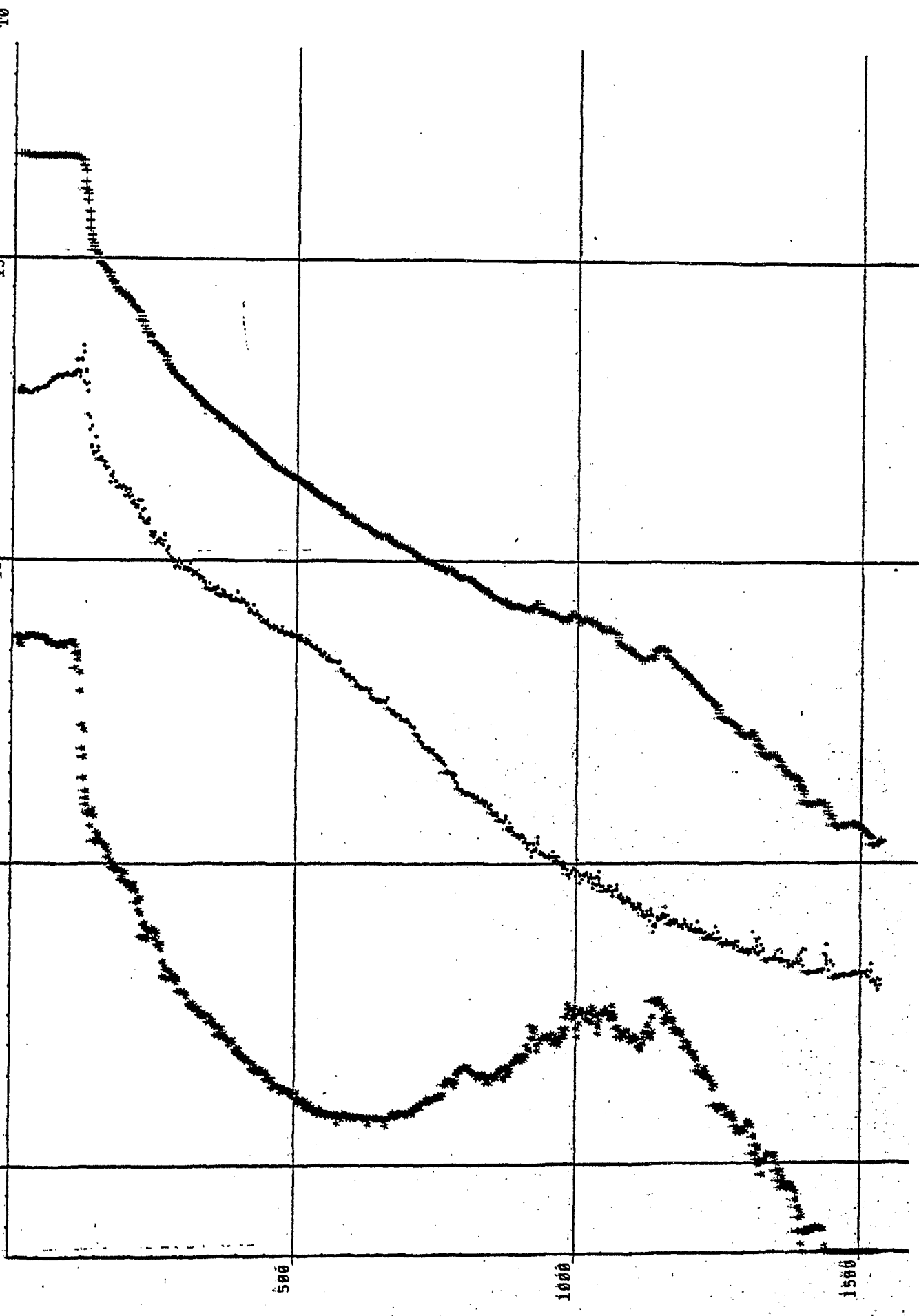


POSITION 66 DATE: 5. 4.82 STATION 34 PROFILE: 48

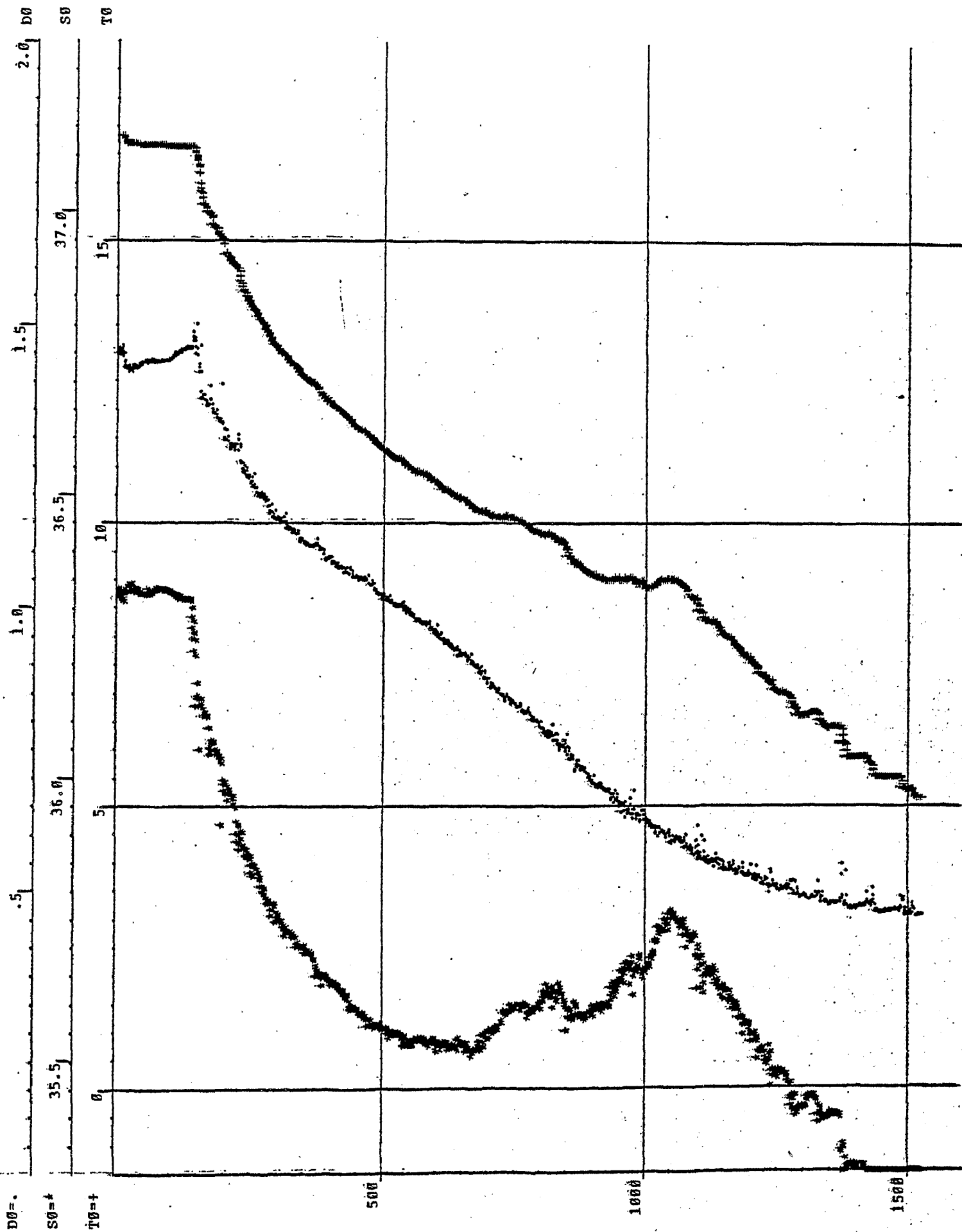
D0=.

S0=*

T0=+



POSEIDON 66 DATE: 5. 4. 82 STATION: 305 PROFILE: 49

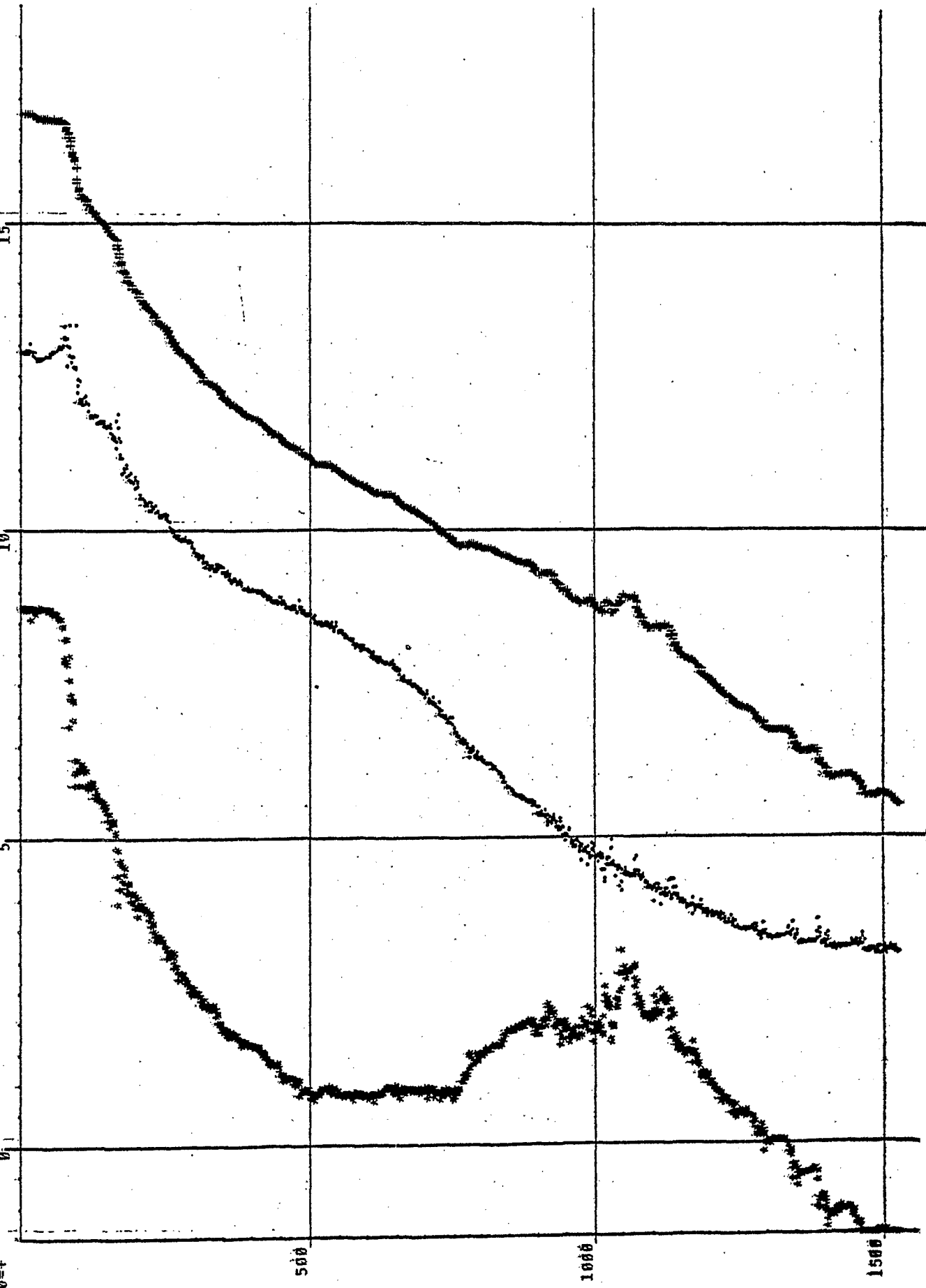


POSITION 86 DATE: 5. 4.82 STATION: 506 PROFILE: 50

D0= 35.5 1.0 1.5 2.0 D0

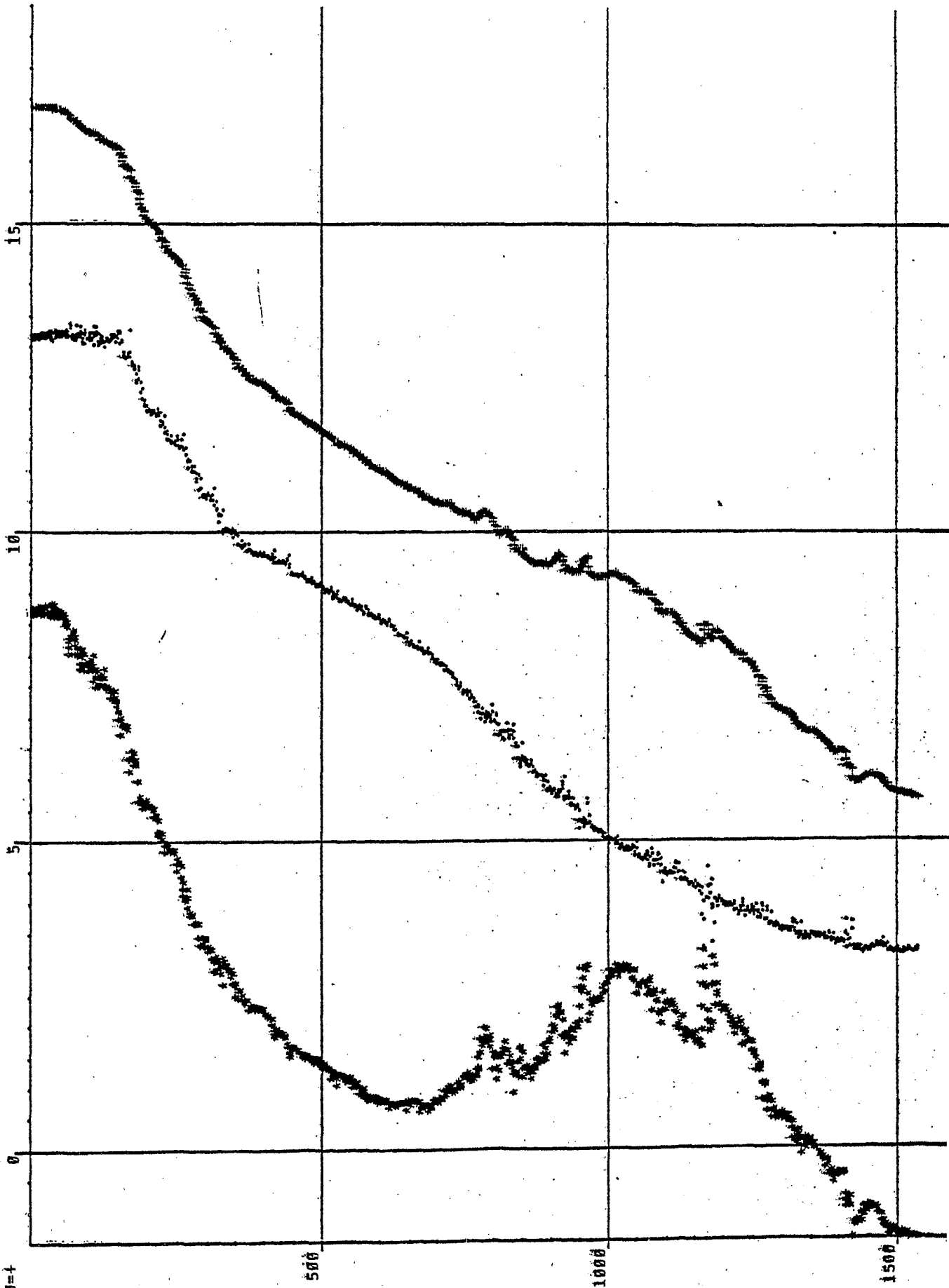
S0= 36.0 36.5 37.0 S0

T0= 0 5 10 15 T0

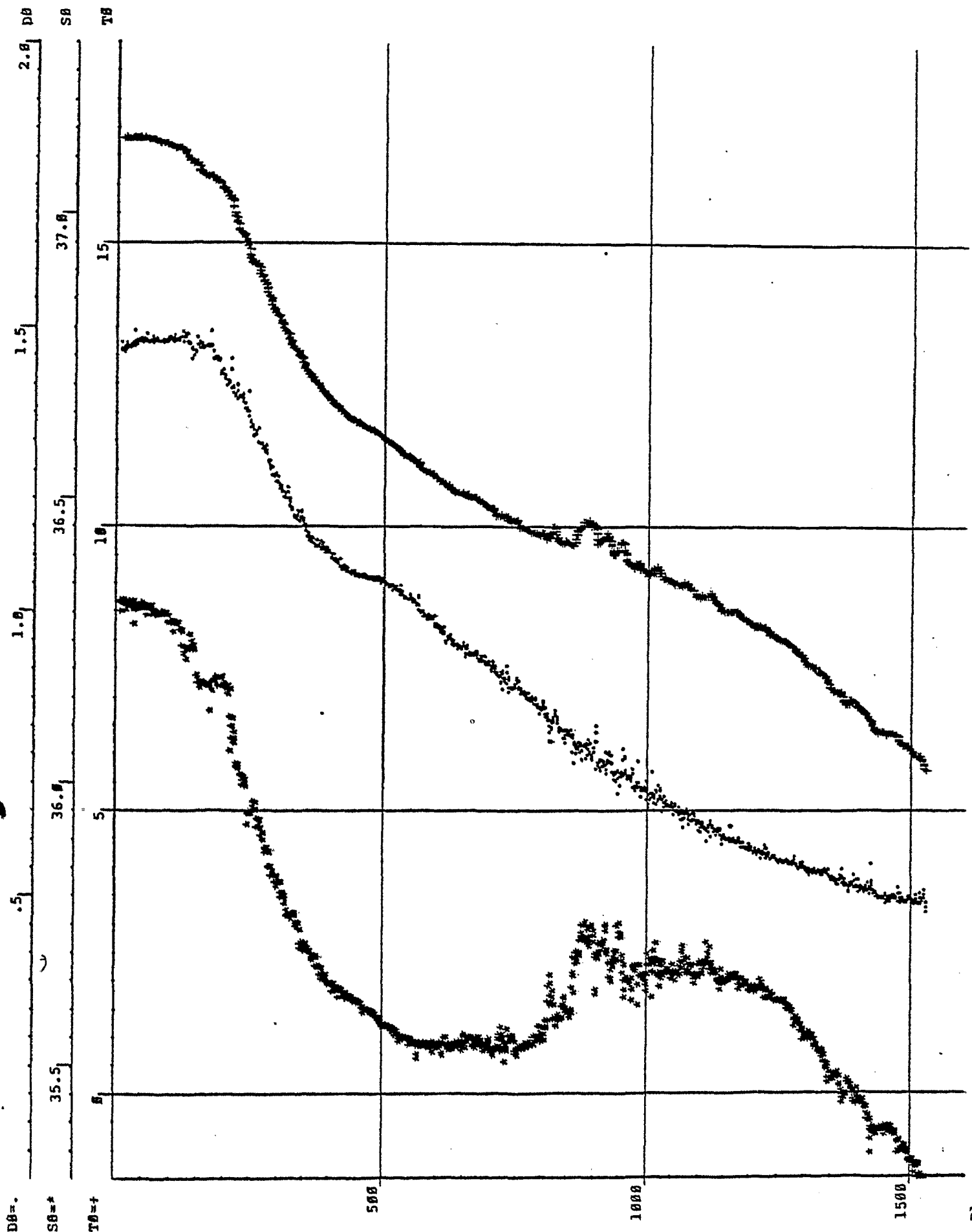


POSEIDON 86 DATE: 6. 4.82 STATION 37 PROFILE: 51

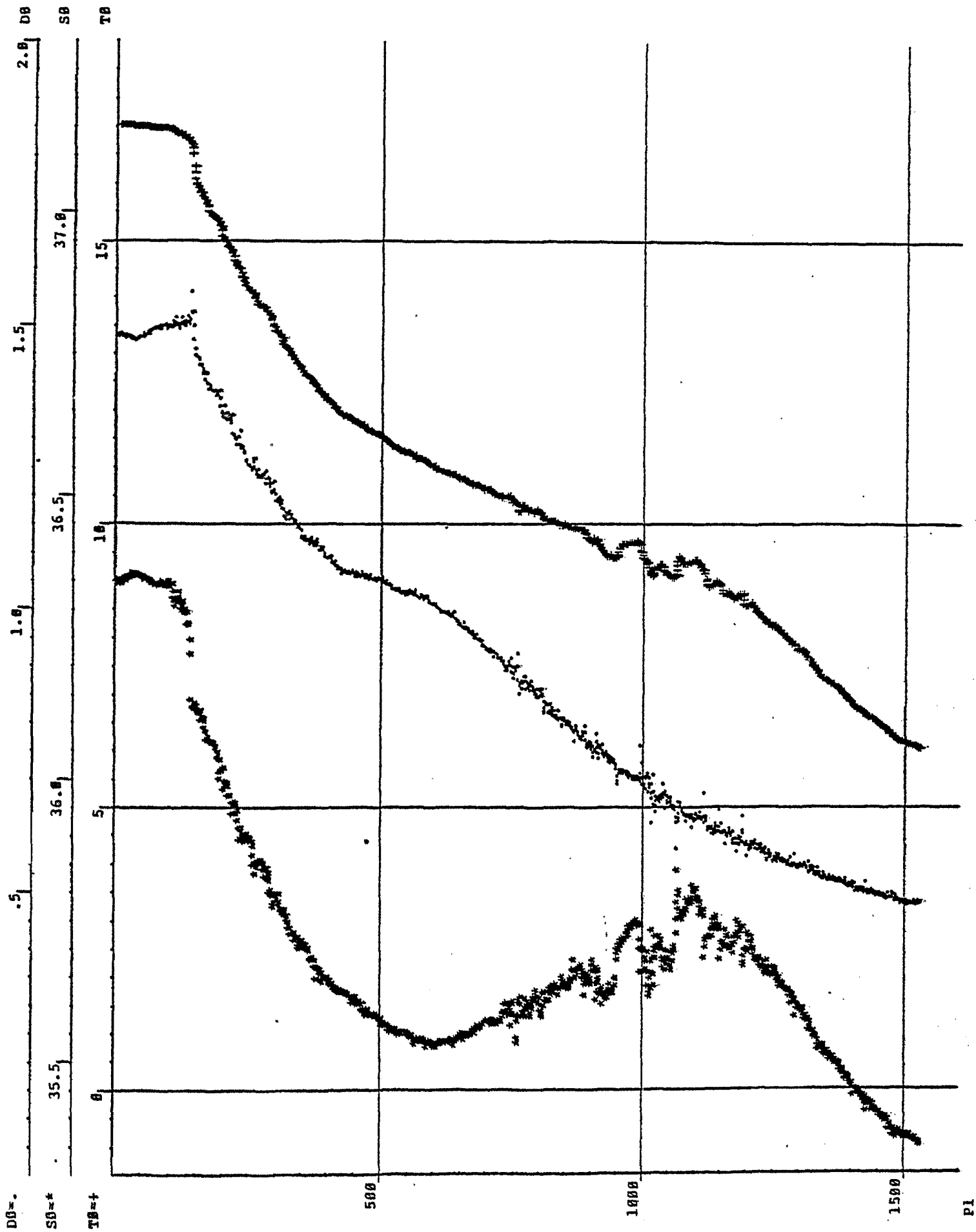
D0= 2.0 D0
 S0= 35.5 S0
 T0= 0 T0



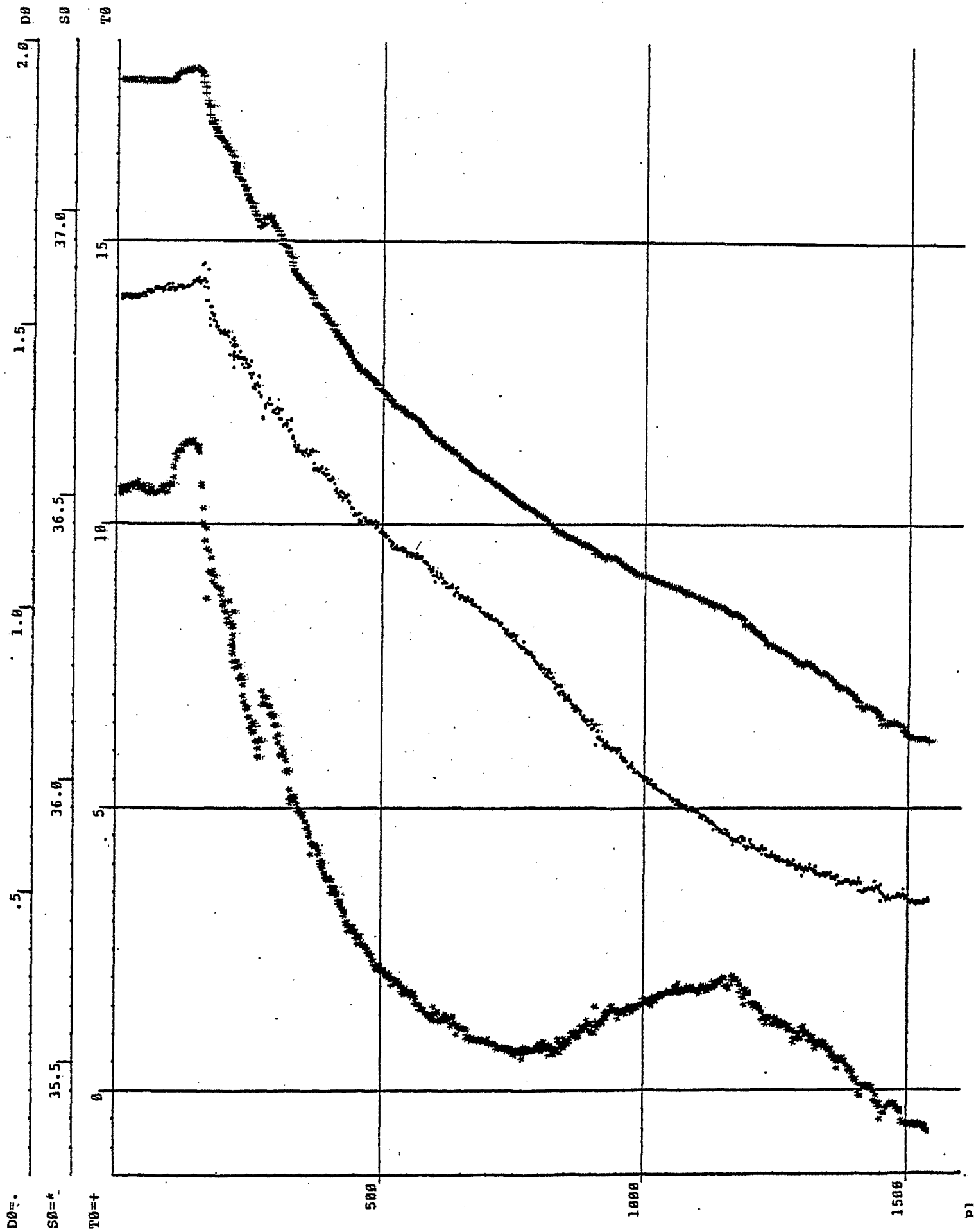
POSEIDON 86 DATE: 6. 4.82 STATION: 388 PROFILE: 52

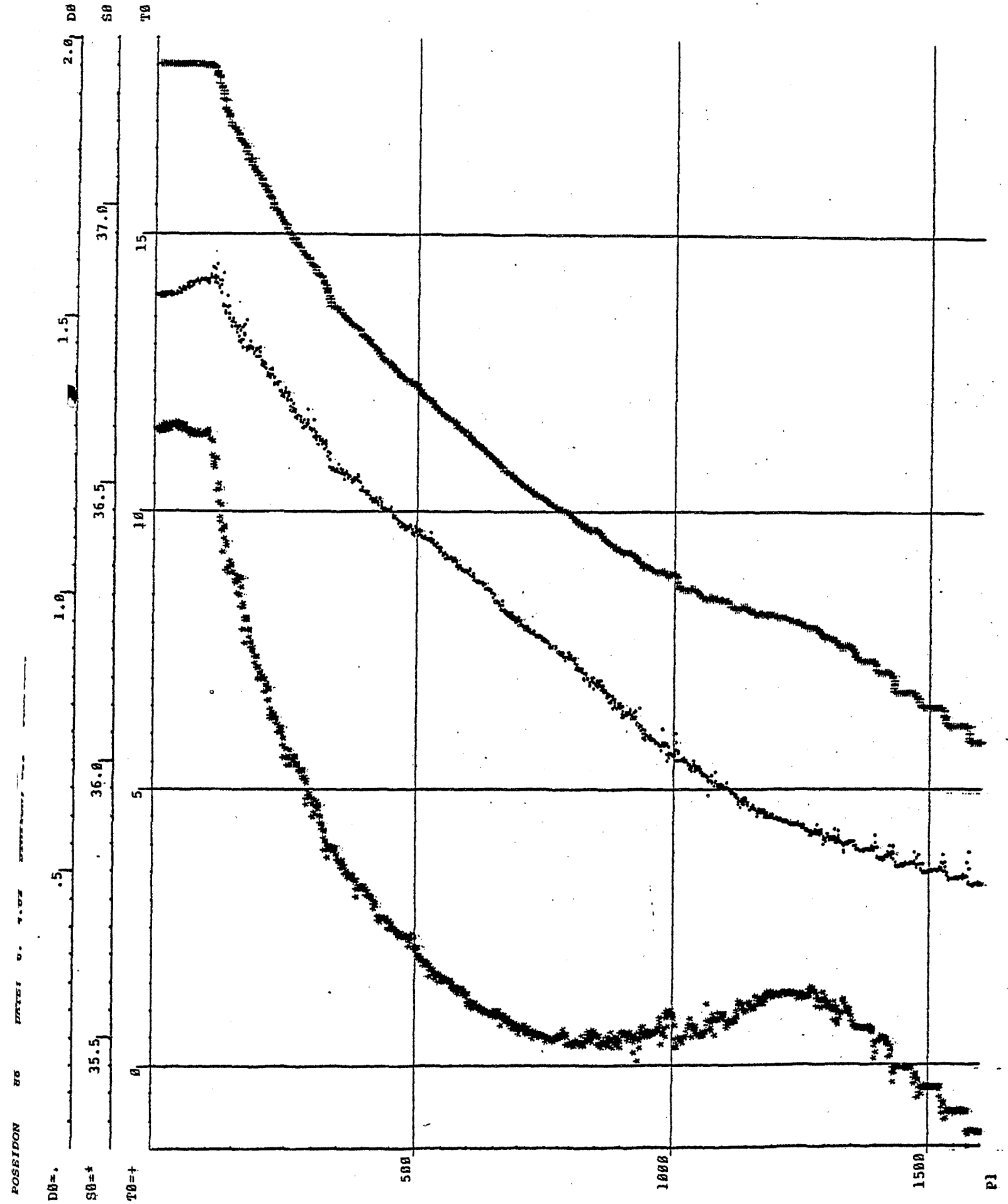


POSEIDON B6 DATE: 6. 4.82 STATION: 389 PROFILE: 53

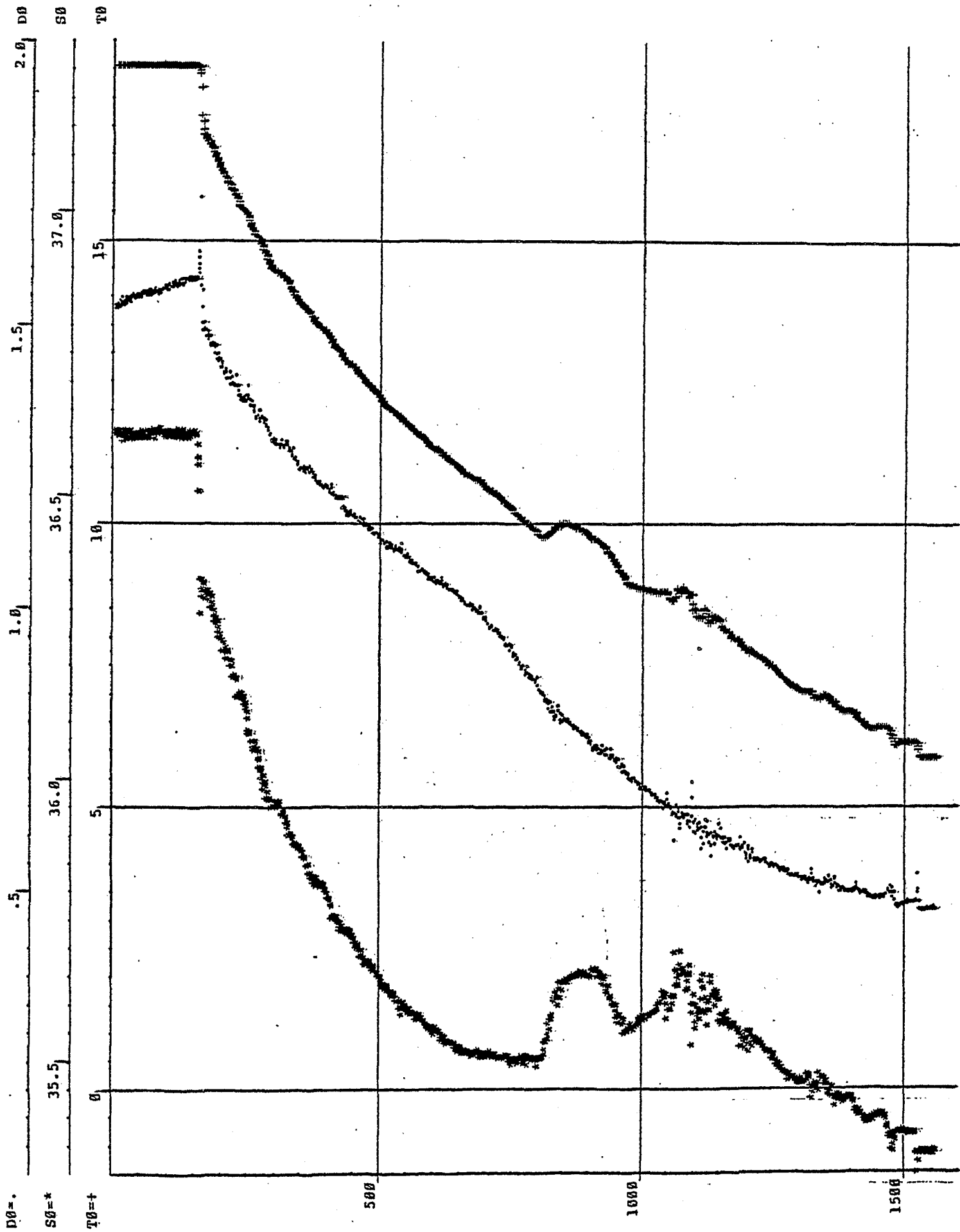


POSEIDON 86 DATE: 6. 4.82 STATION: 318 PROFILE: 54

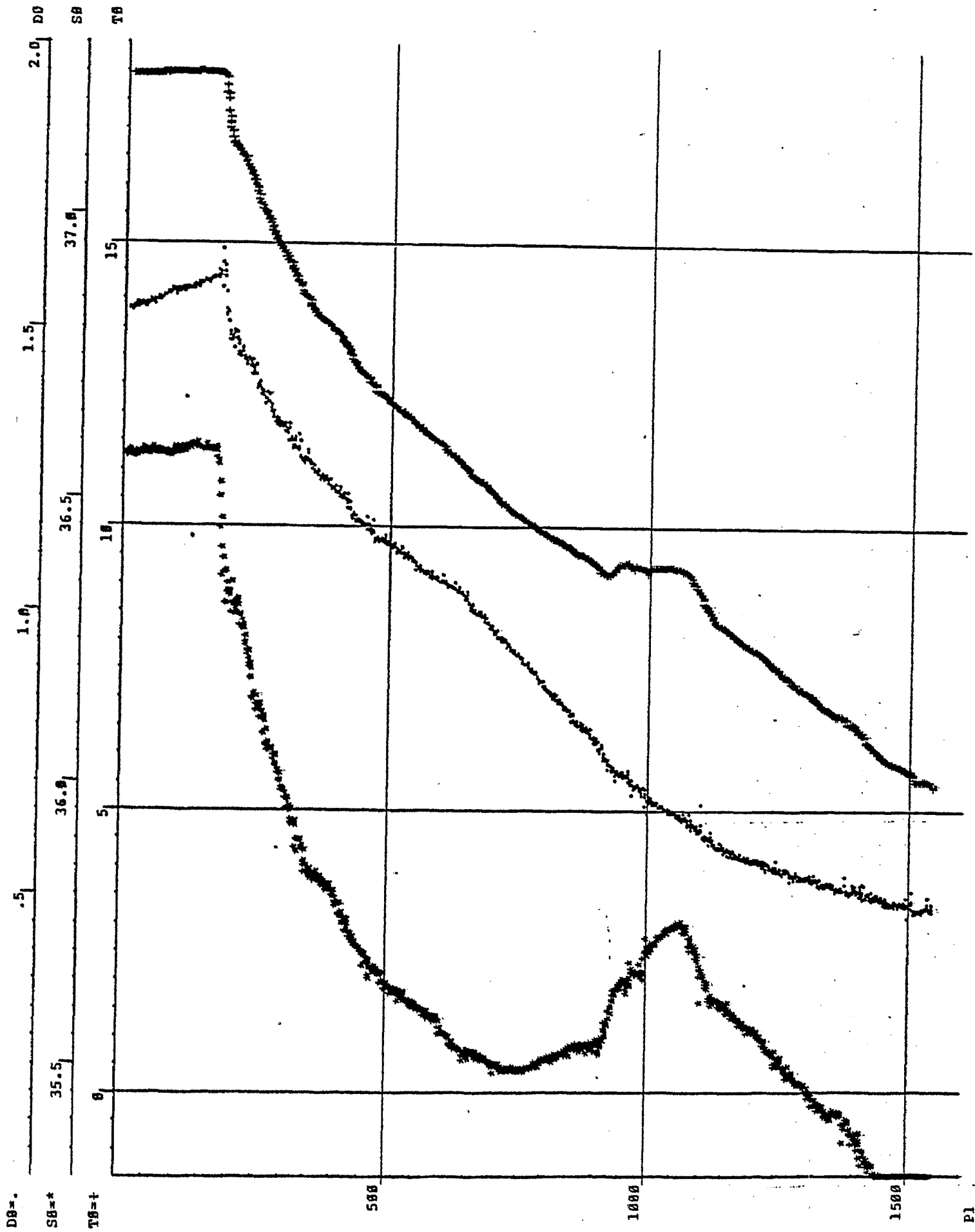


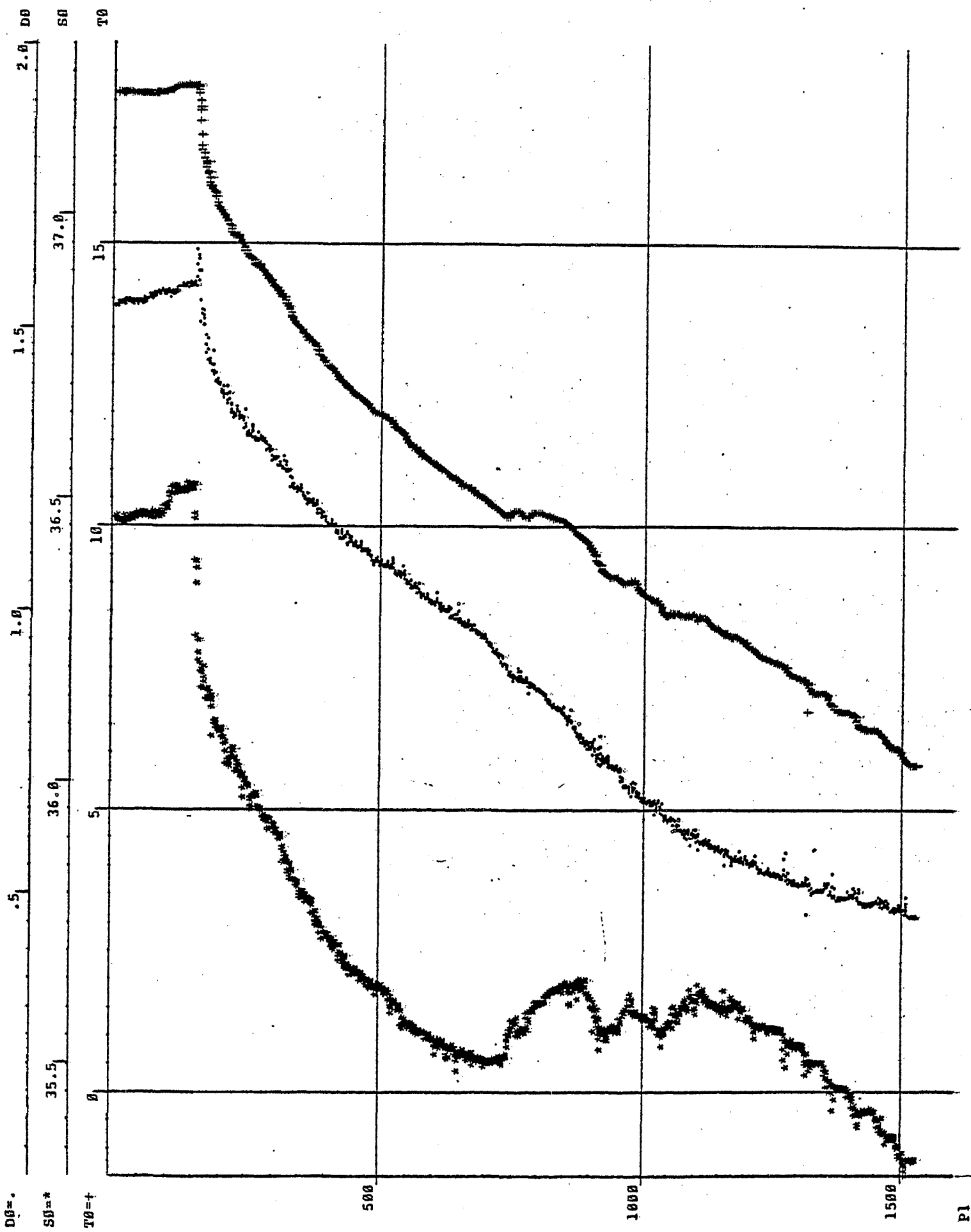


POSEIDON 86 DATE: 7. 4.82 STATION: 312 PROFILE: 56



POSEIDON 86 DATE: 7. 4.82 STATION: 313 PROFILE: 57





POSEIDON 86 DATE: 7, 4-82 STATION: JIS PROPERTY

D0=.

S0=*

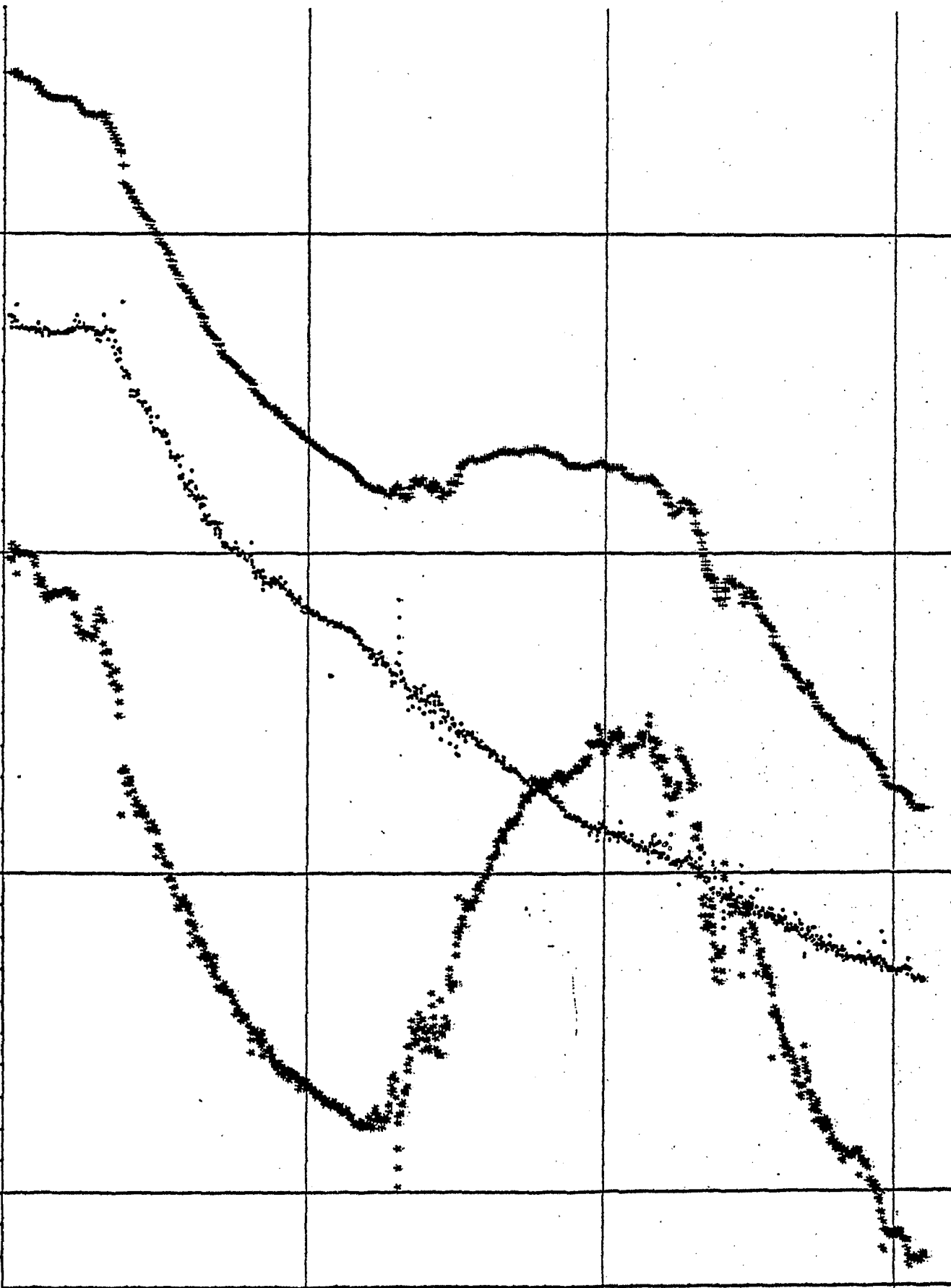
T0=+

35.5 36.0 36.5 37.0 2.0 D0

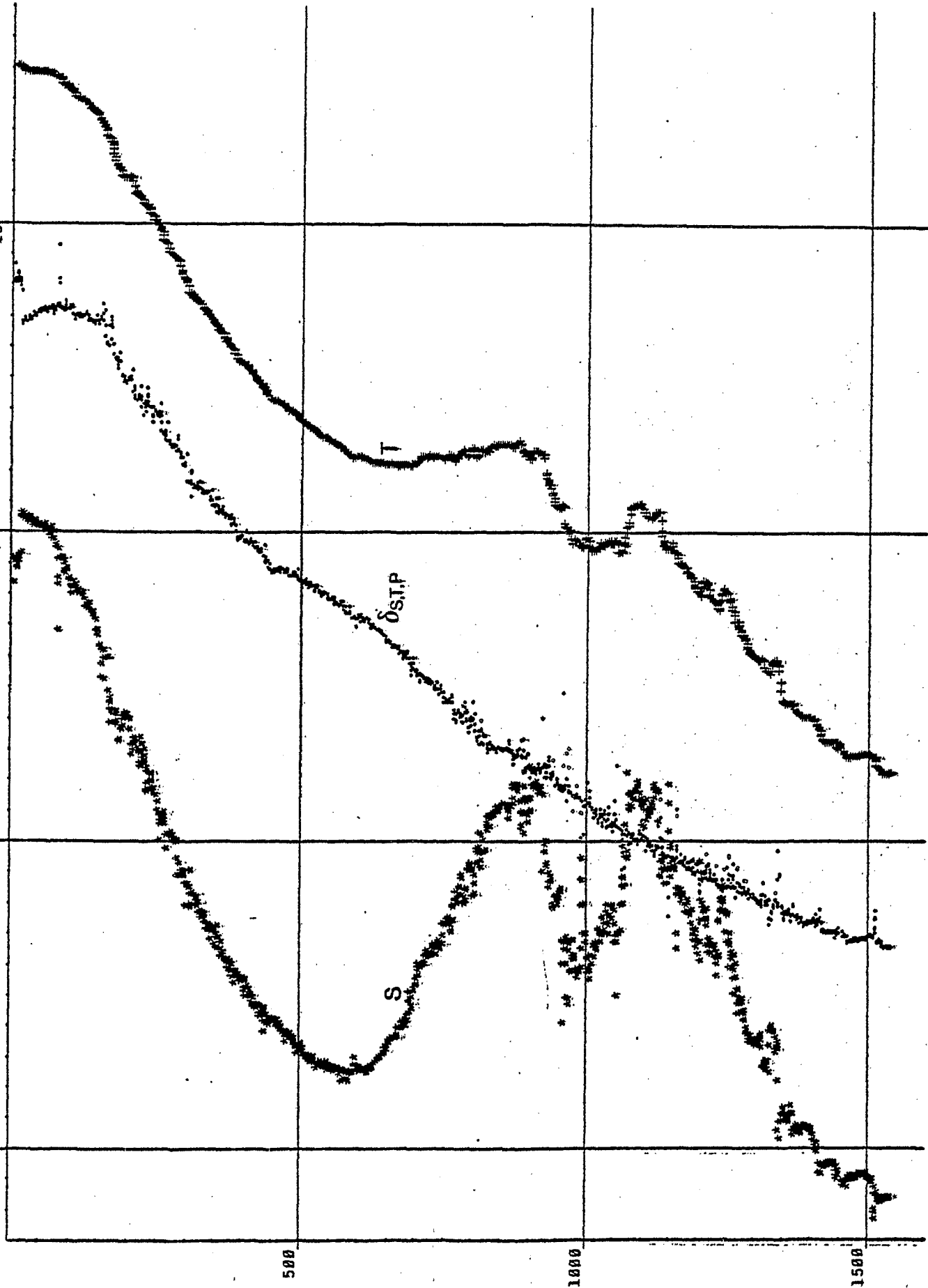
0 5 10 15

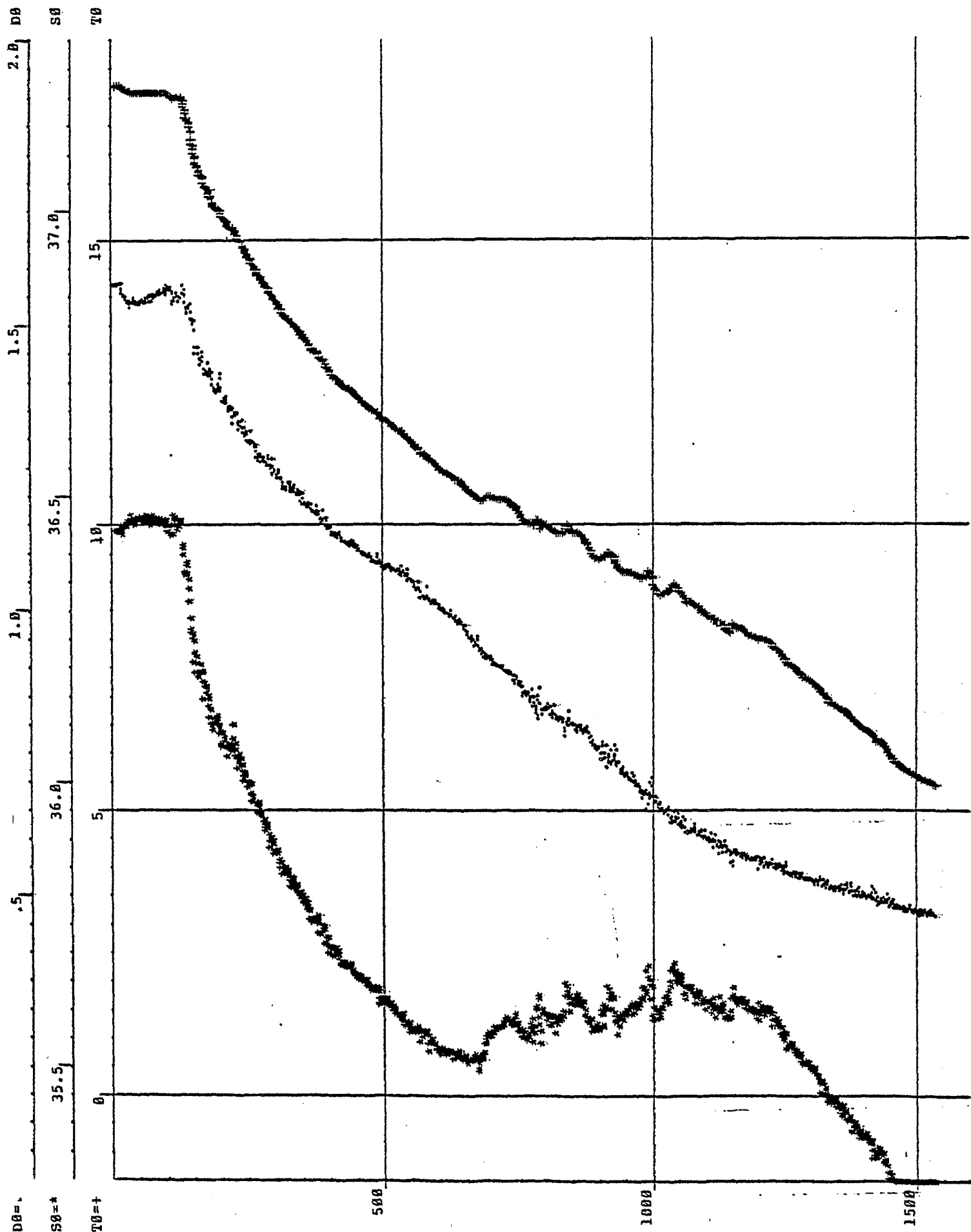
500 1000 1500

P1



D0 = .
 S0 = * 35.5 36.0 36.5 1.0 1.5 2.0 D0
 T0 = + 0 5 10 15 20 T0

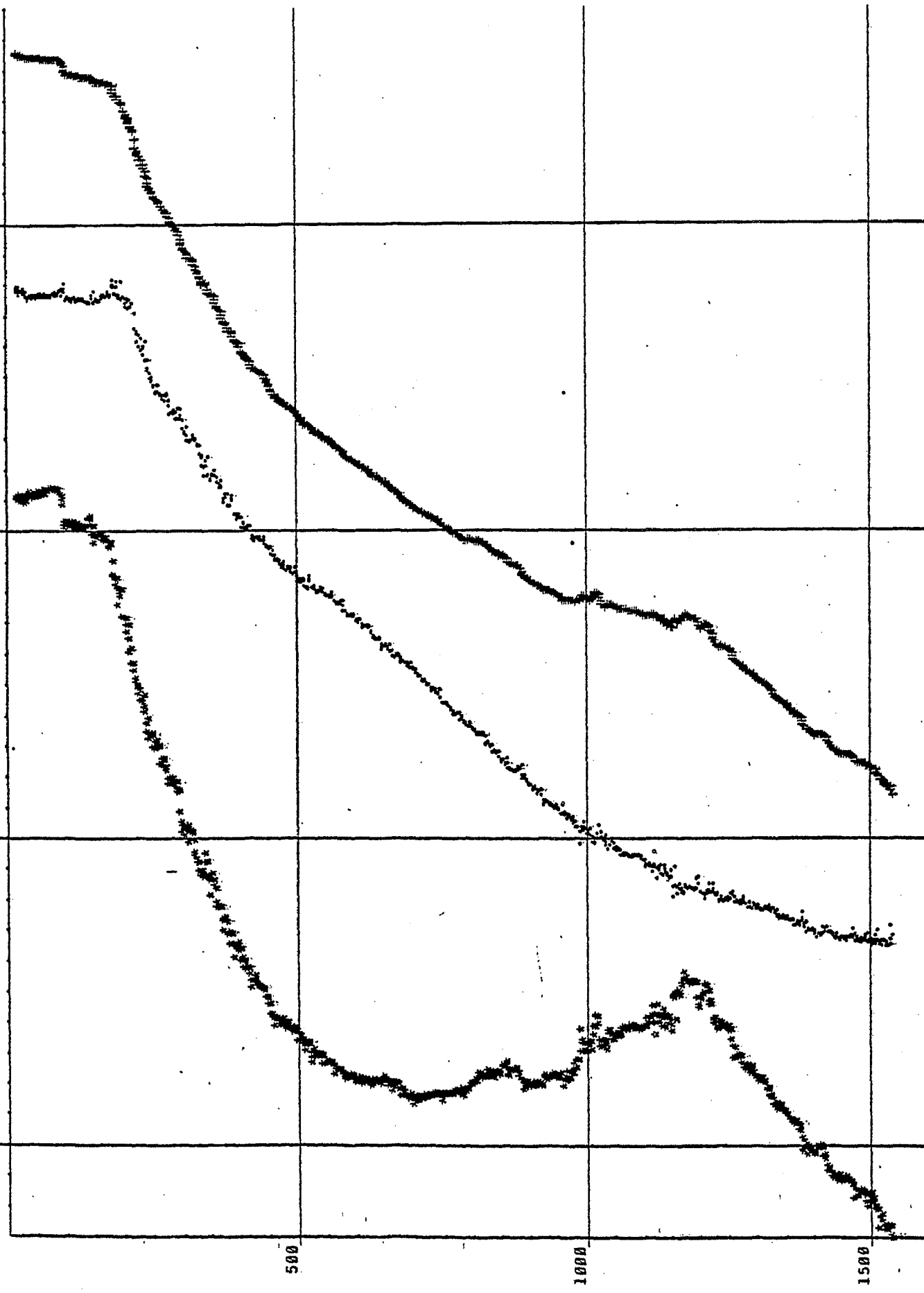




D0 = . 2.0 D0

S0 = * 35.5 36.0 36.5 37.0 S0

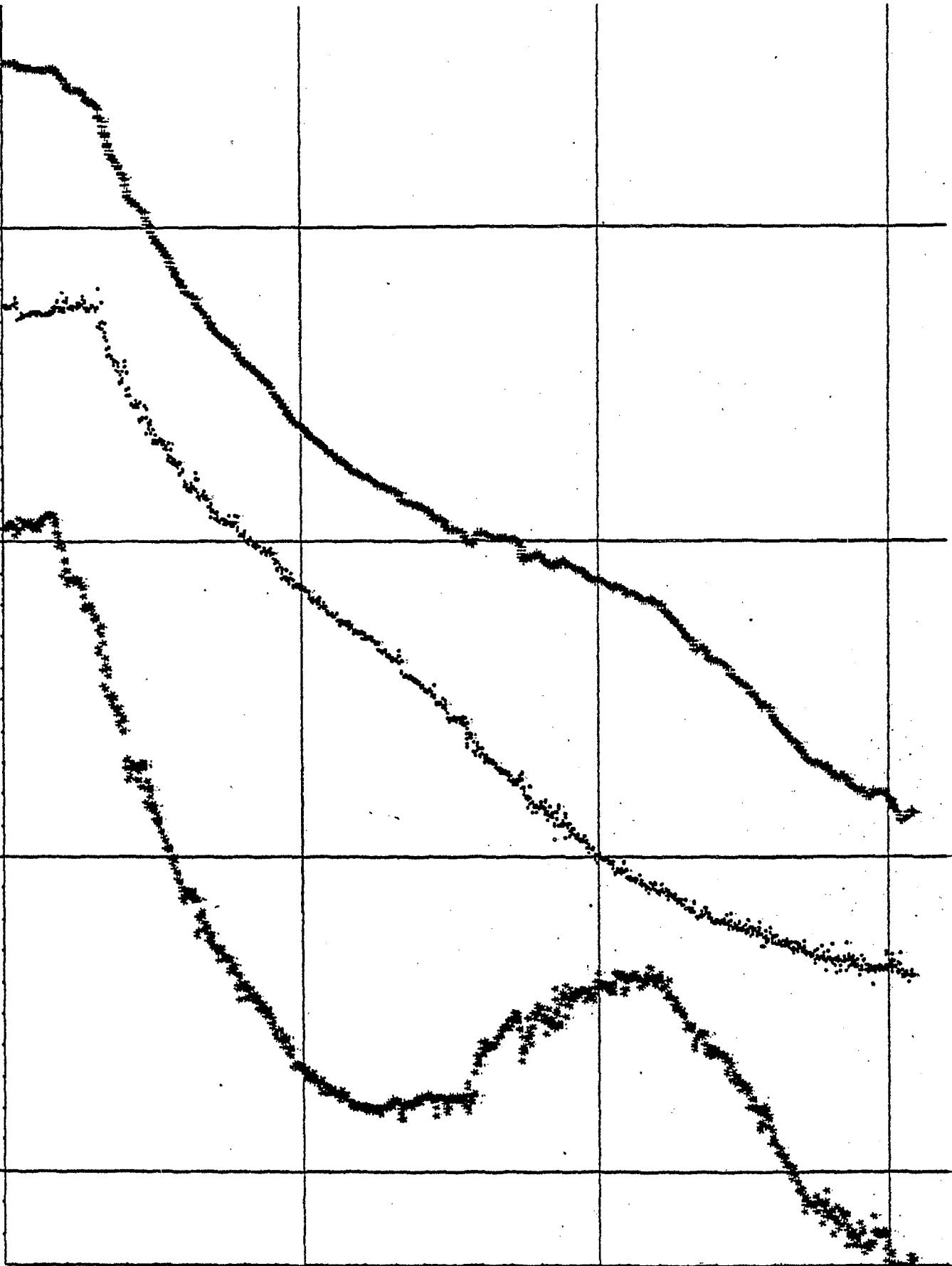
T0 = + 0 5 10 15 T0

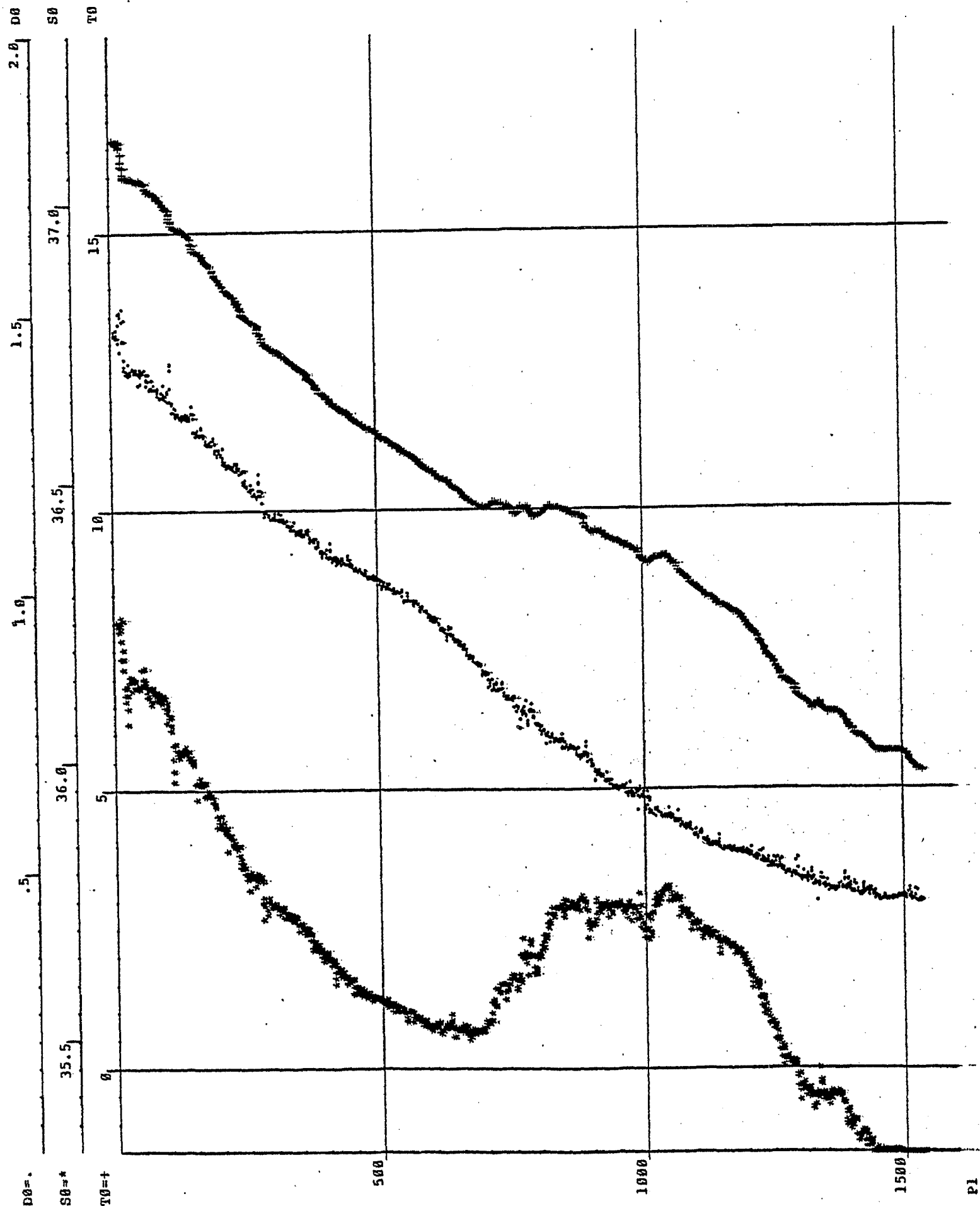


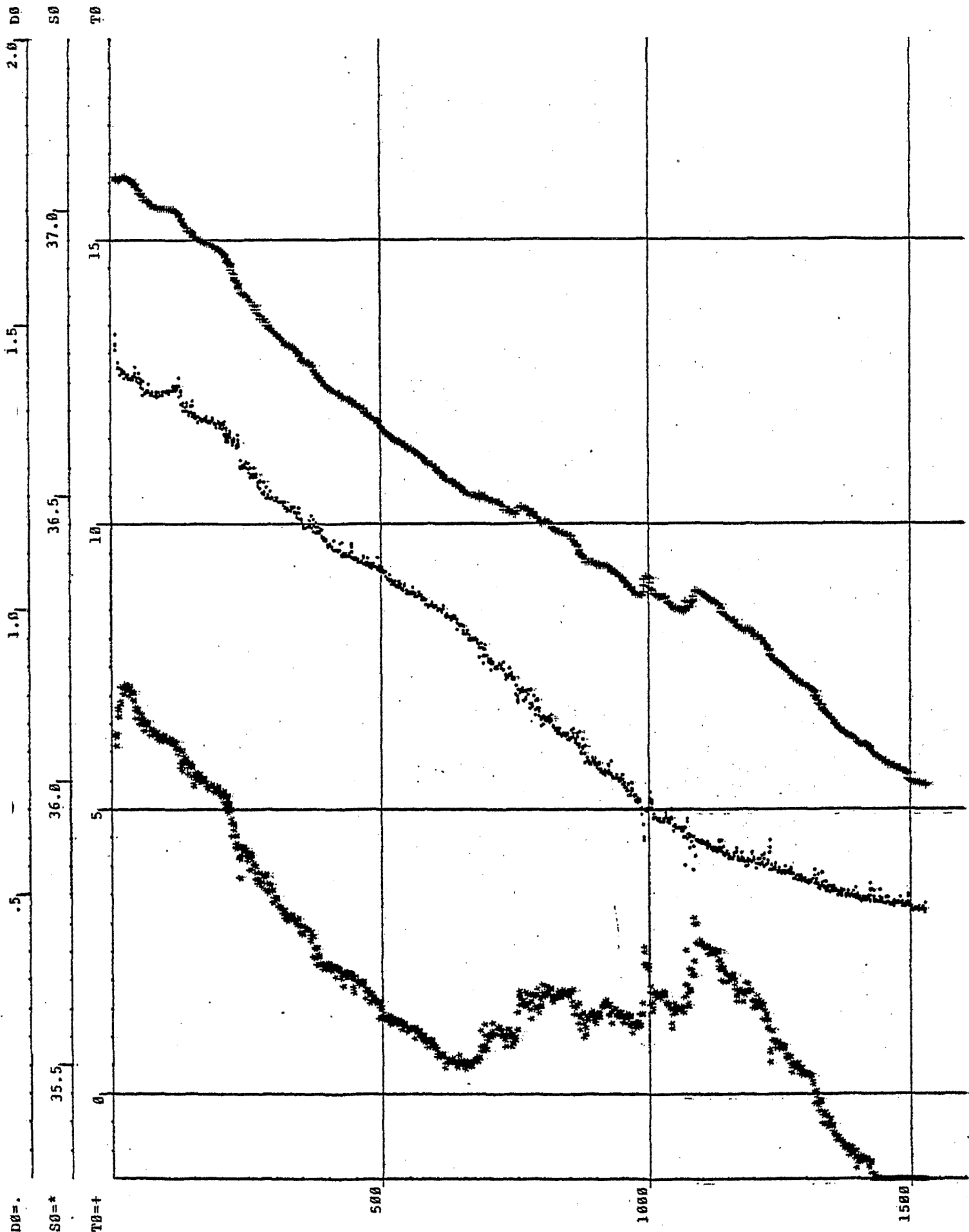
U0 = . 2.0 1.5 1.0 .5

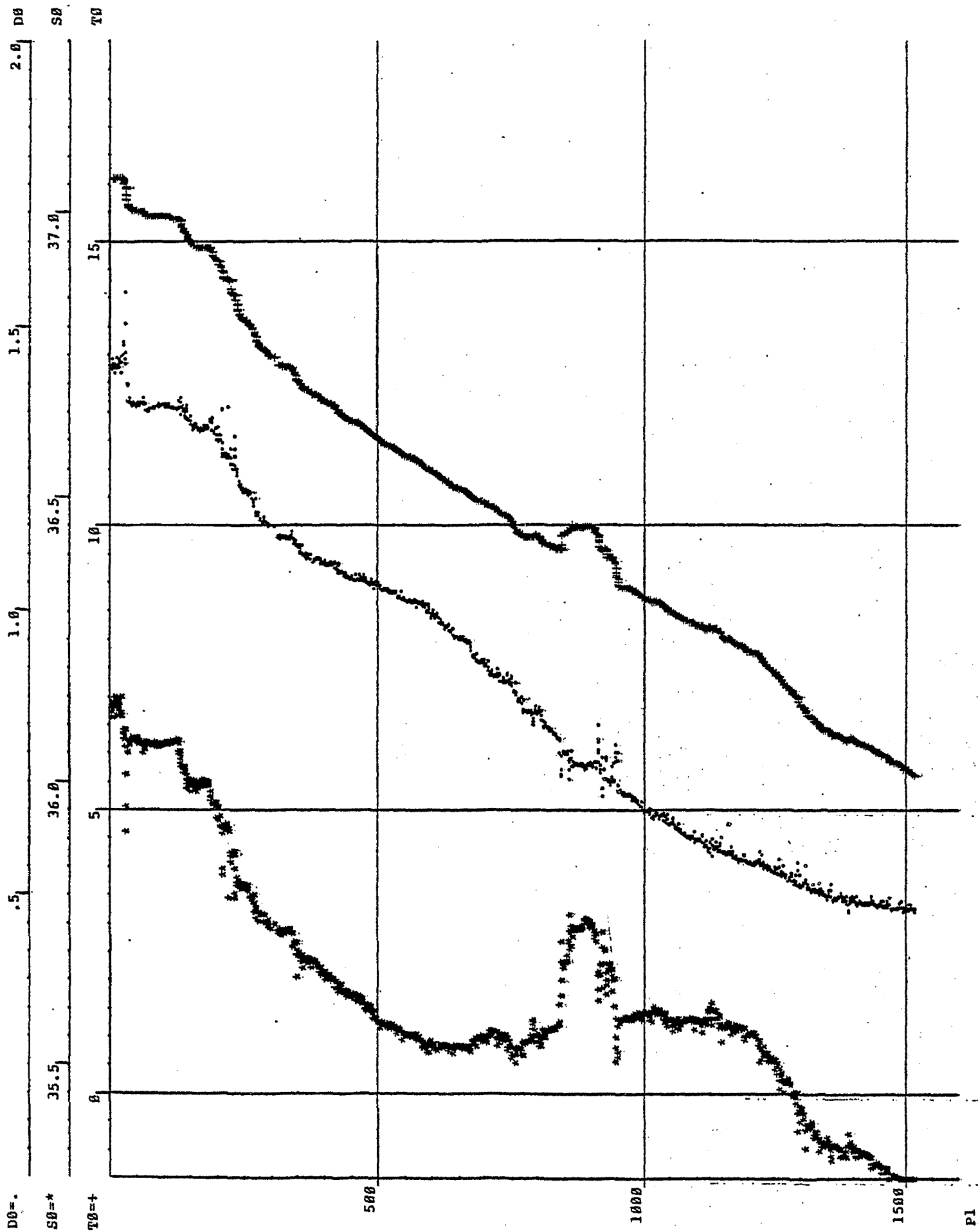
S0 = * 35.5 36.0 36.5 37.0 38.0

T0 = + 0 5 10 15 20



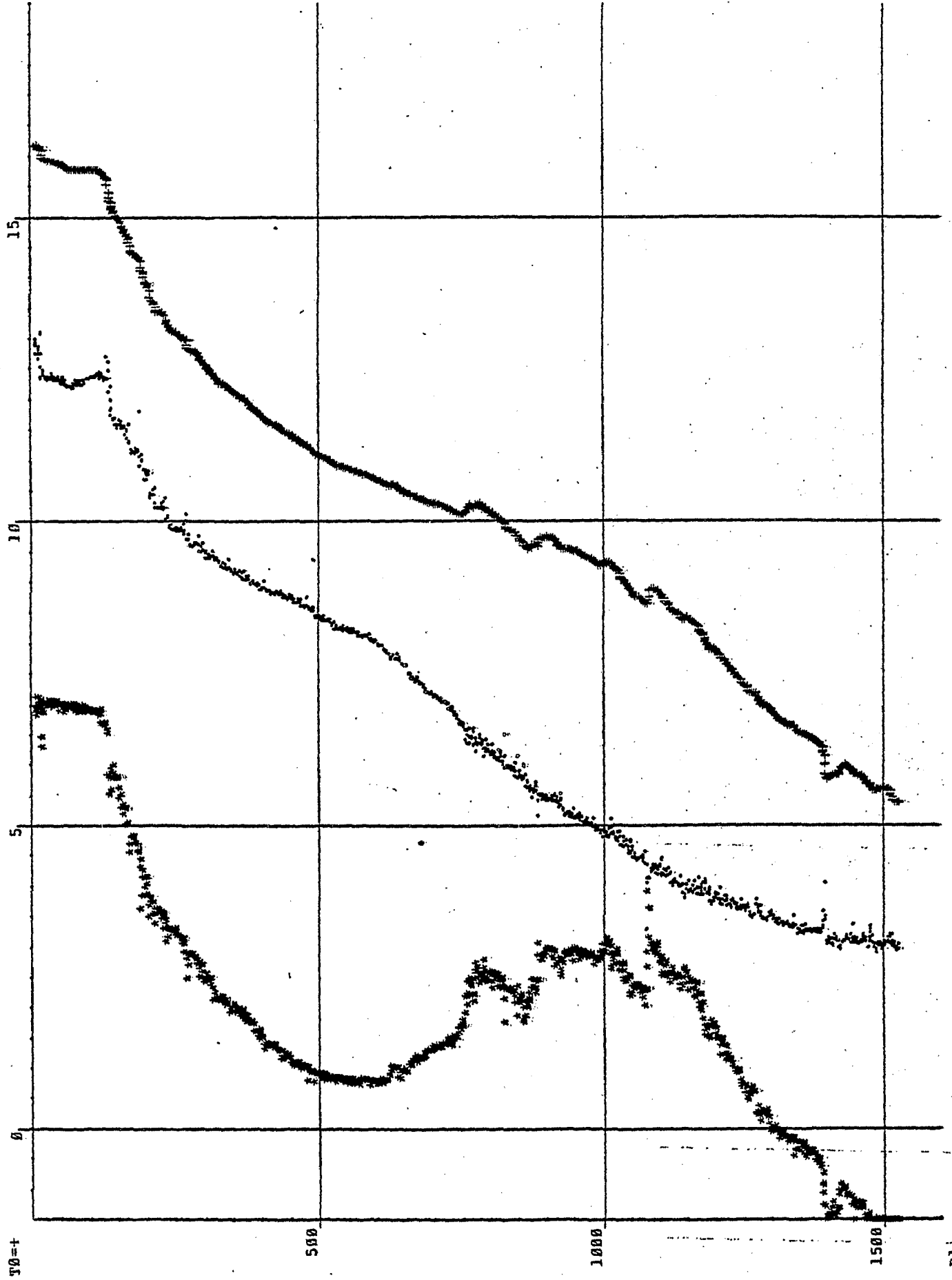






POSEIDON 86 DATE: 9. 4. 82 STATION: 36.5

DB= .5 1.0 1.5 2.0 DB
SB= 35.5 36.0 36.5 37.0 SB
T0= 0 5 10 15 T0



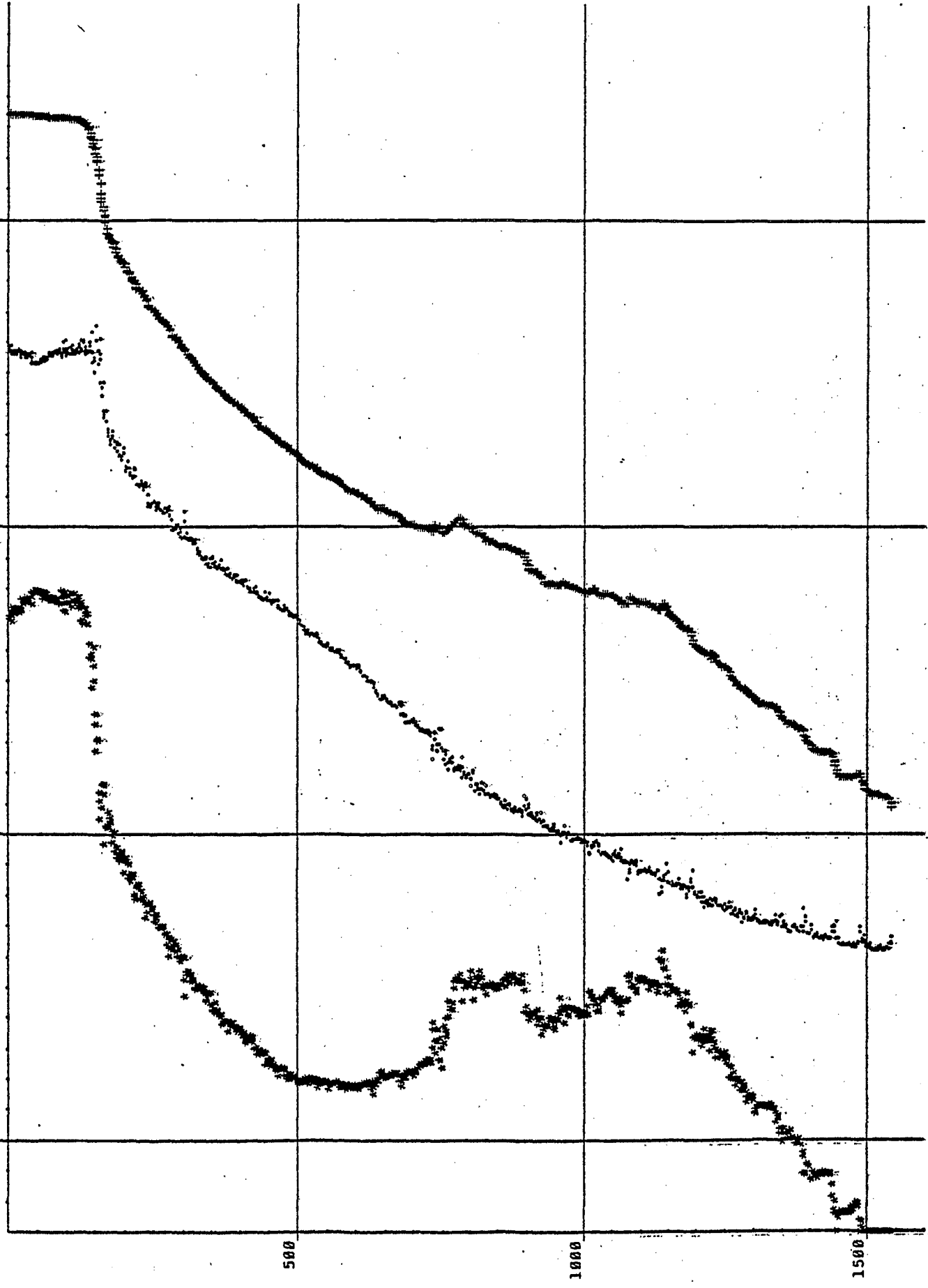
Pl

POSEIDON 66 DATE: 9. 4.82 STATION: 324 PROFILE: 68

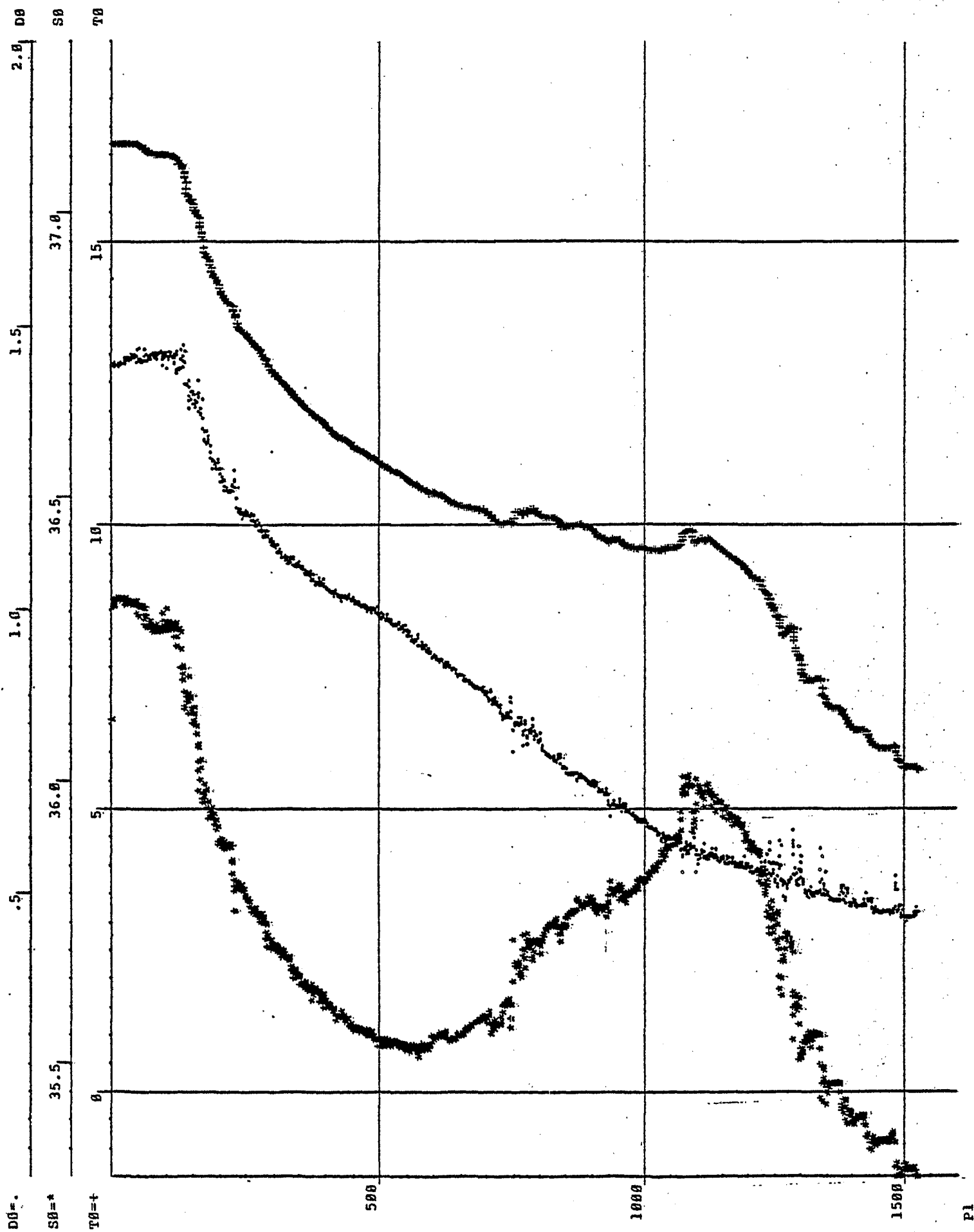
D0=-. 2.0 D0

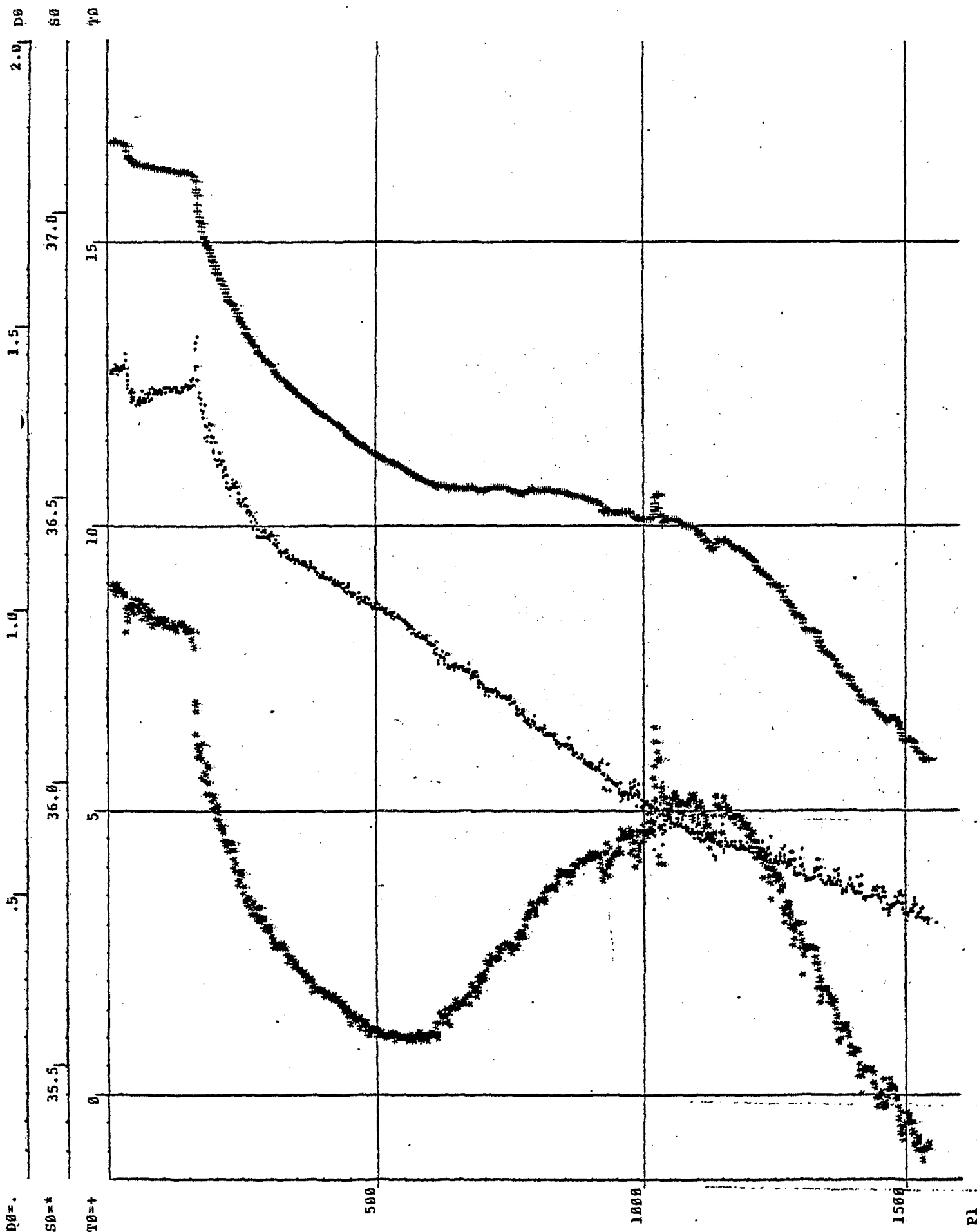
S0=+ 35.5 36.0 36.5 37.0 S0

T0=+ 0 5 10 15 T0

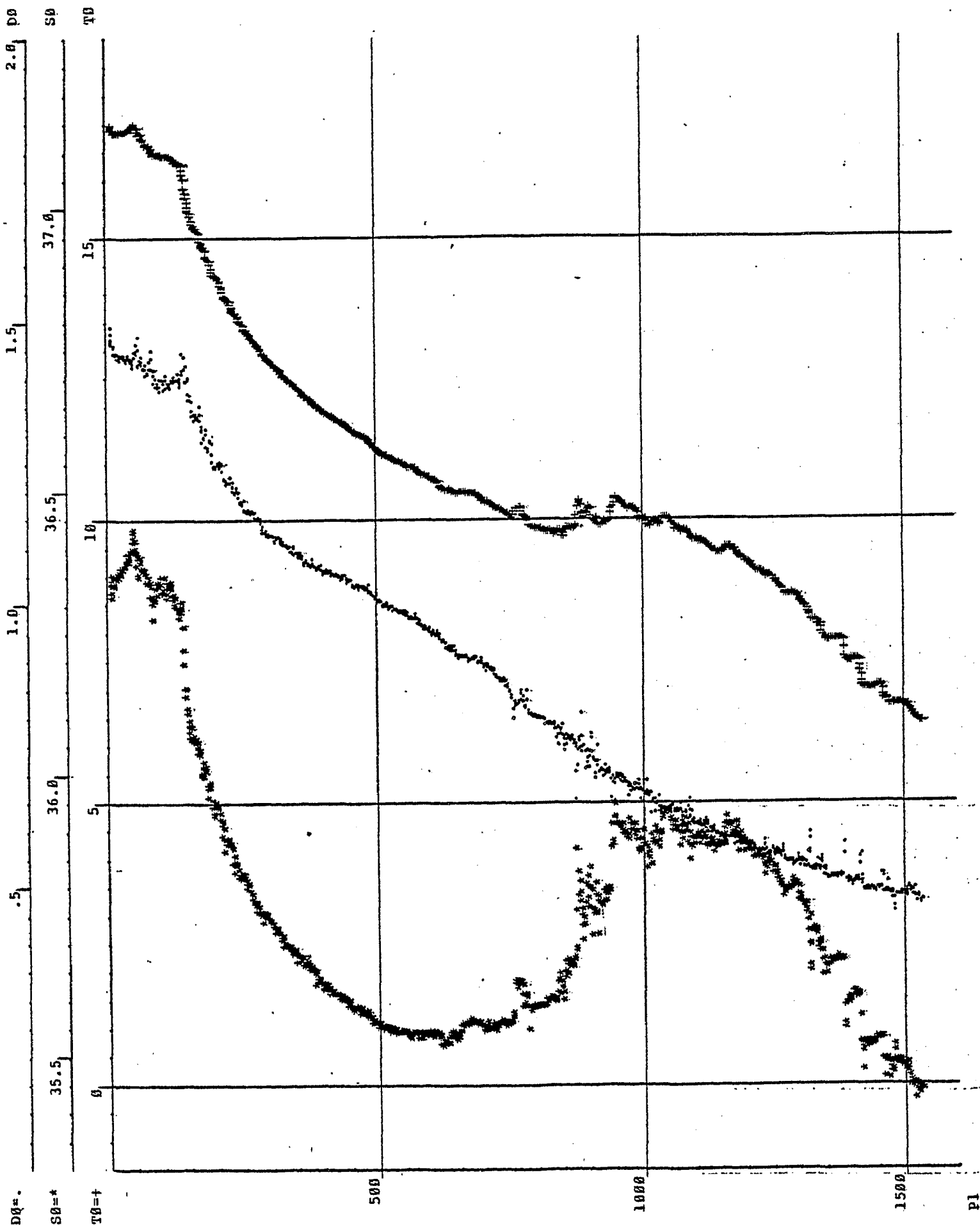


POSEIDON 86 DATE: 9. 4.82 STATION: 326 PROFILE: 69





POSEIDON 86 DATE: 9. 4.82 STATION: 328 PROFILE: 71

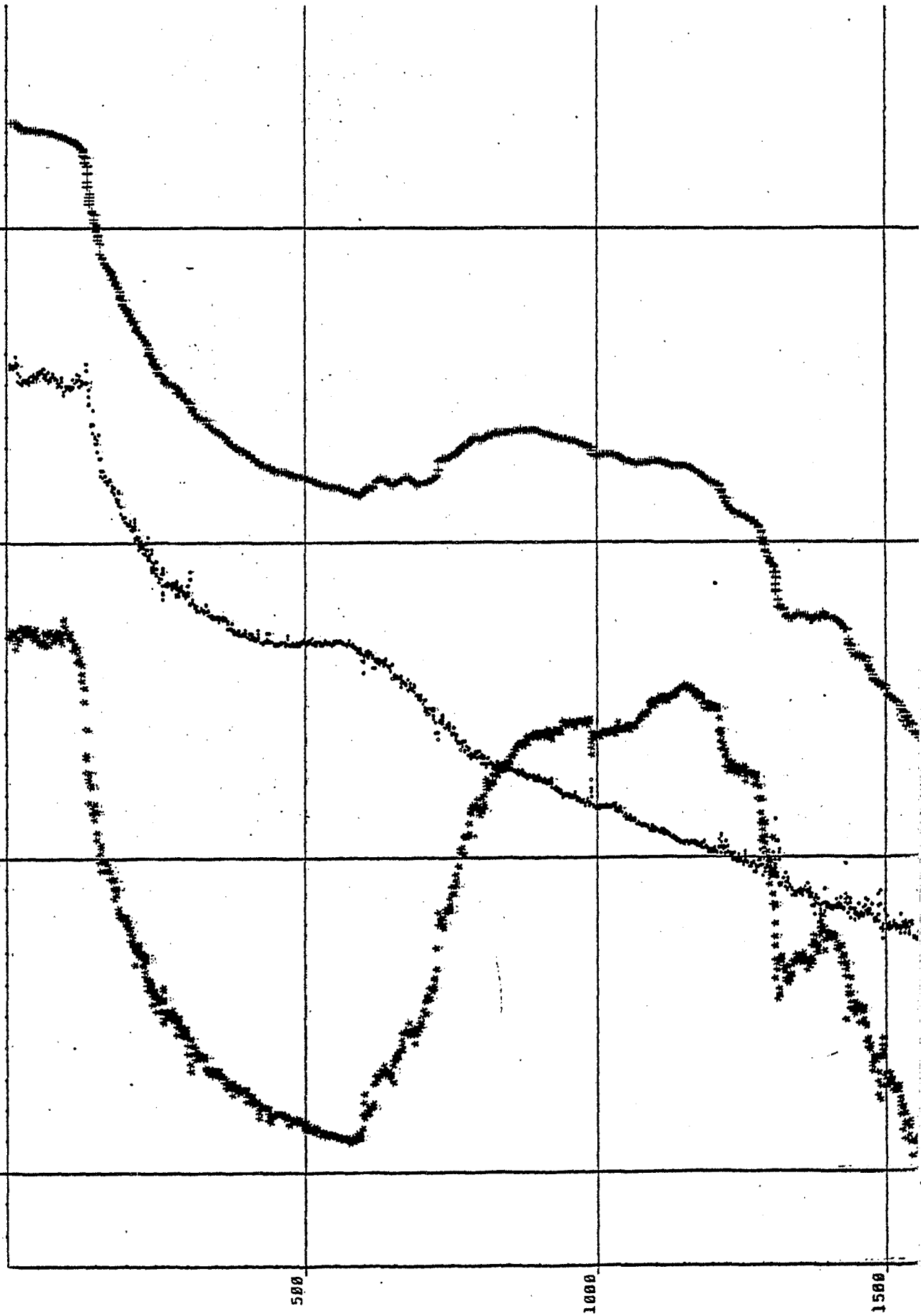


POSEIDON 86 DATE: 9. 4.82 STATION: 329 PROFILE: 72

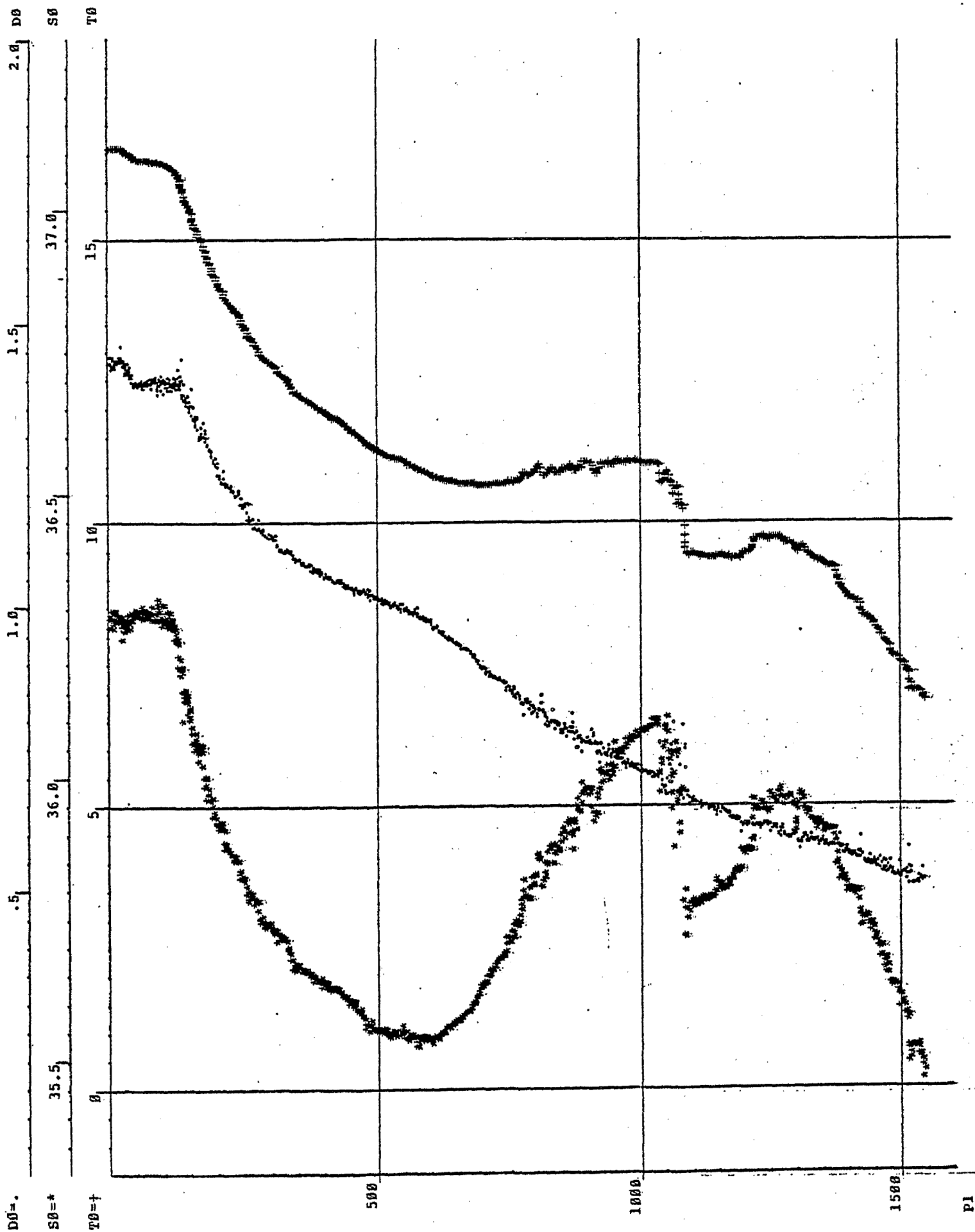
D0= . 2.0 D0

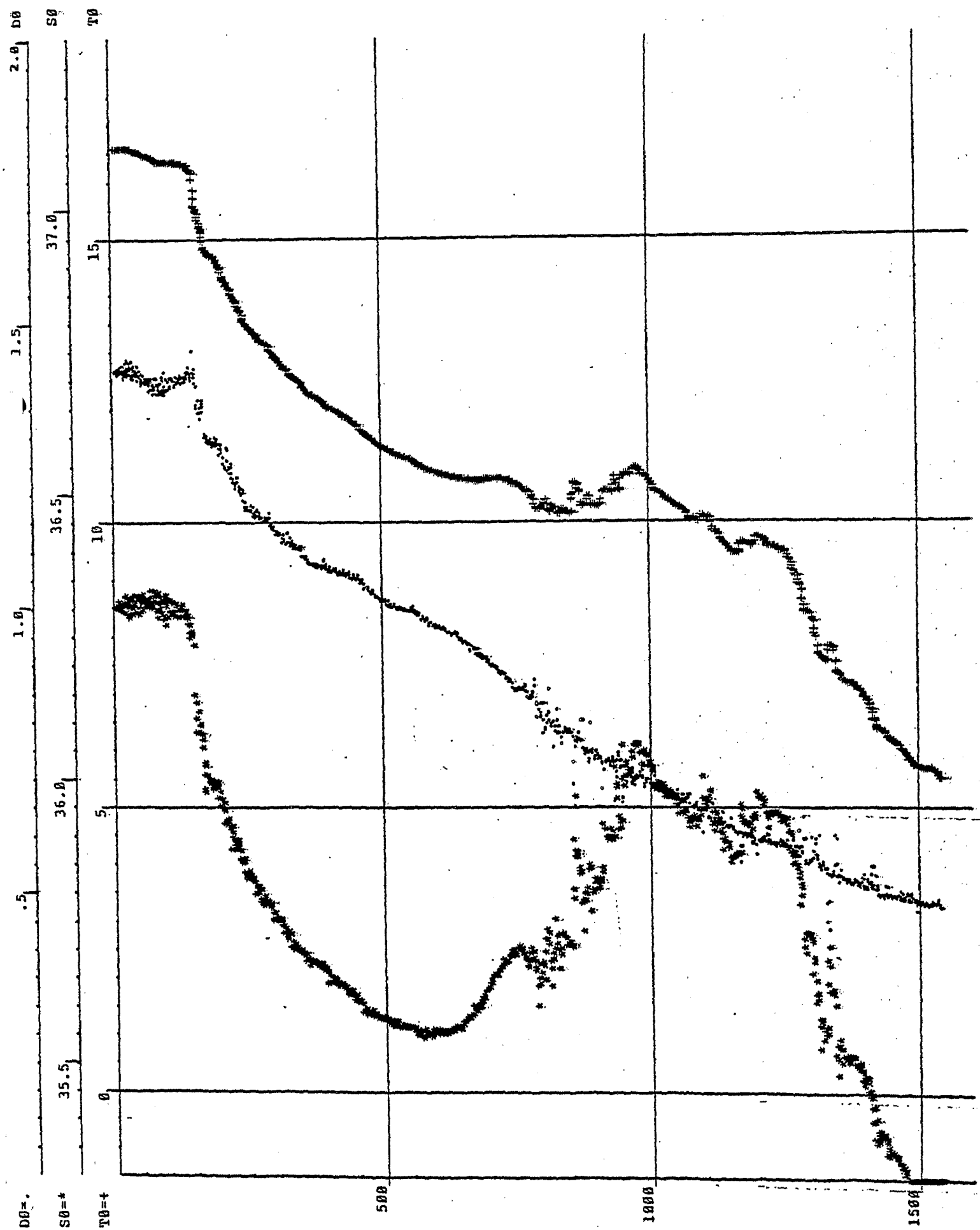
S0=* 35.5 36.0 36.5 37.0 S0

T0=+ 0 5 10 15 T0

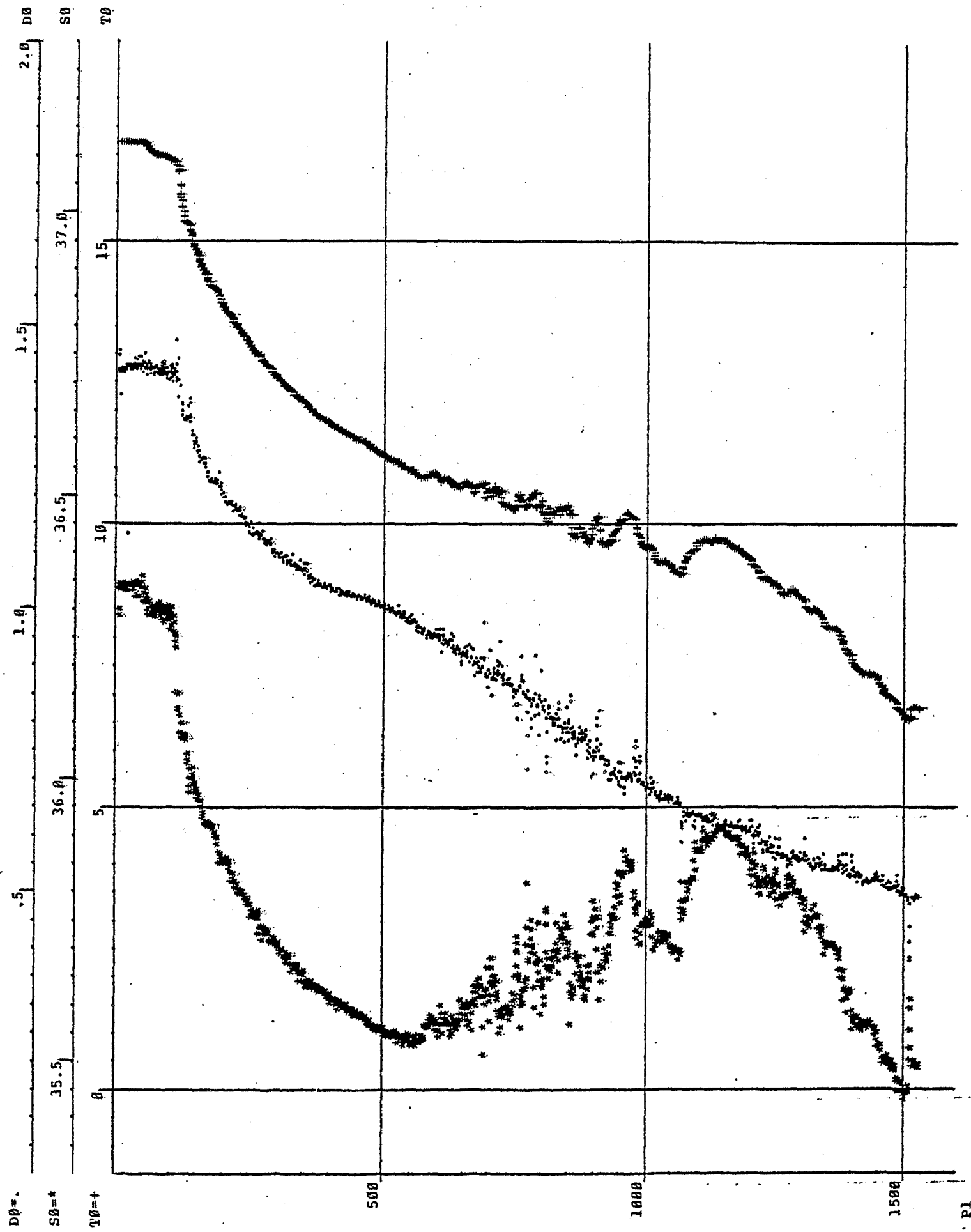


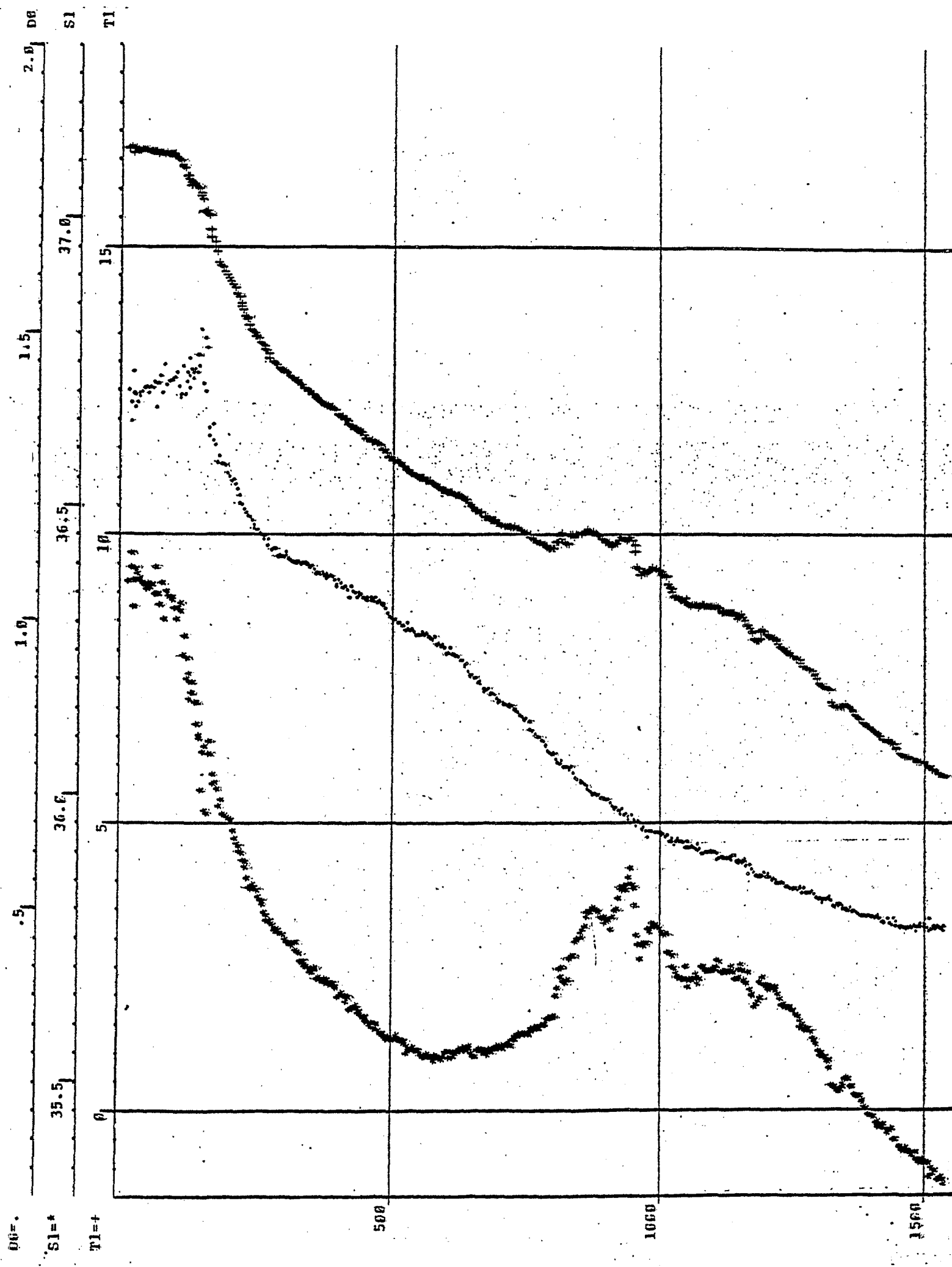
POSEIDON 86 DATE: 18. 4.82 STATION: 338 PROFILE: 73



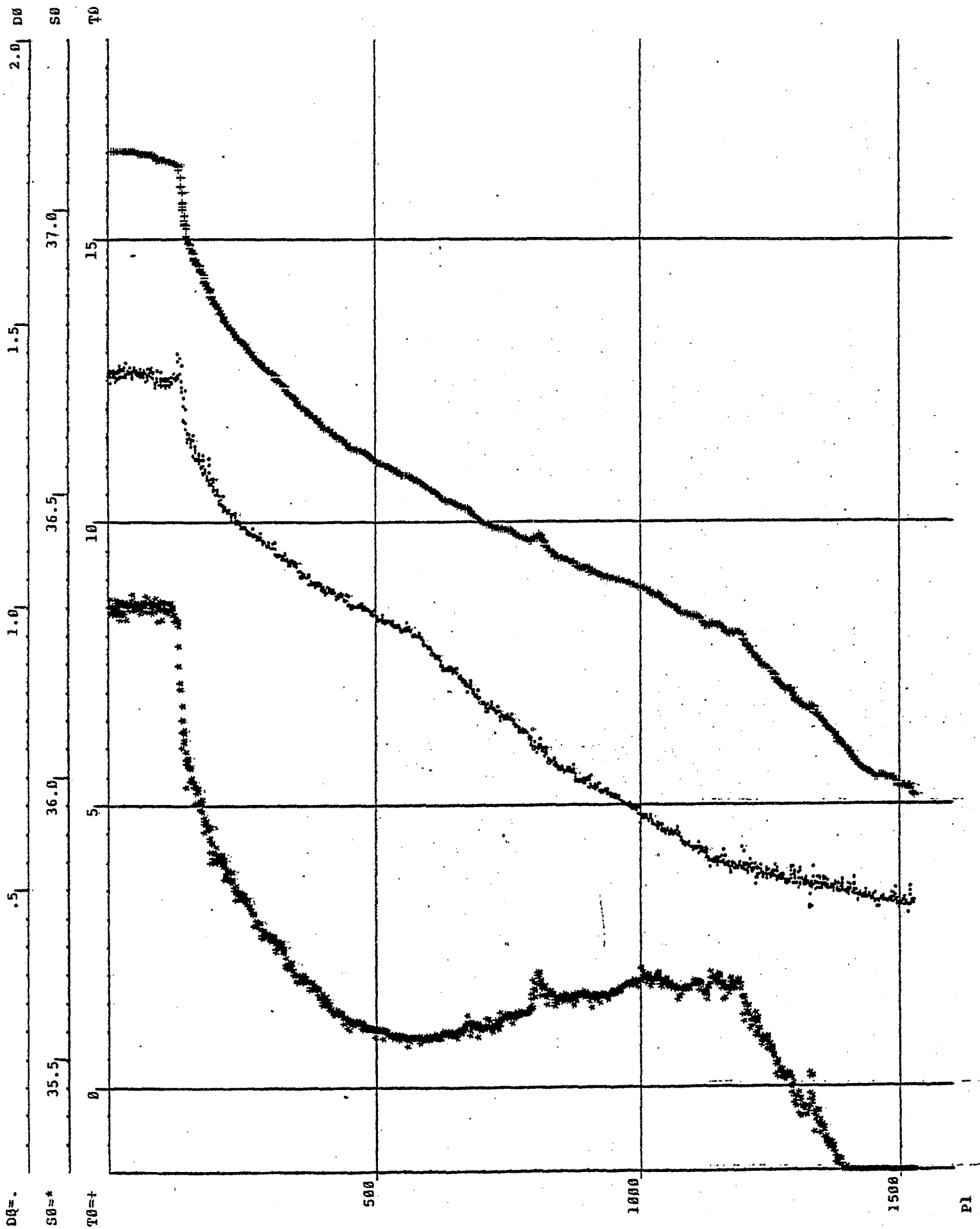


POSEIDON 86 DATE: 18. 4.82 STATION: 332 PROFILE: 75





POSEIDON 86 DATE: 10. 4.82 STATION: 334 PROFILE: 77

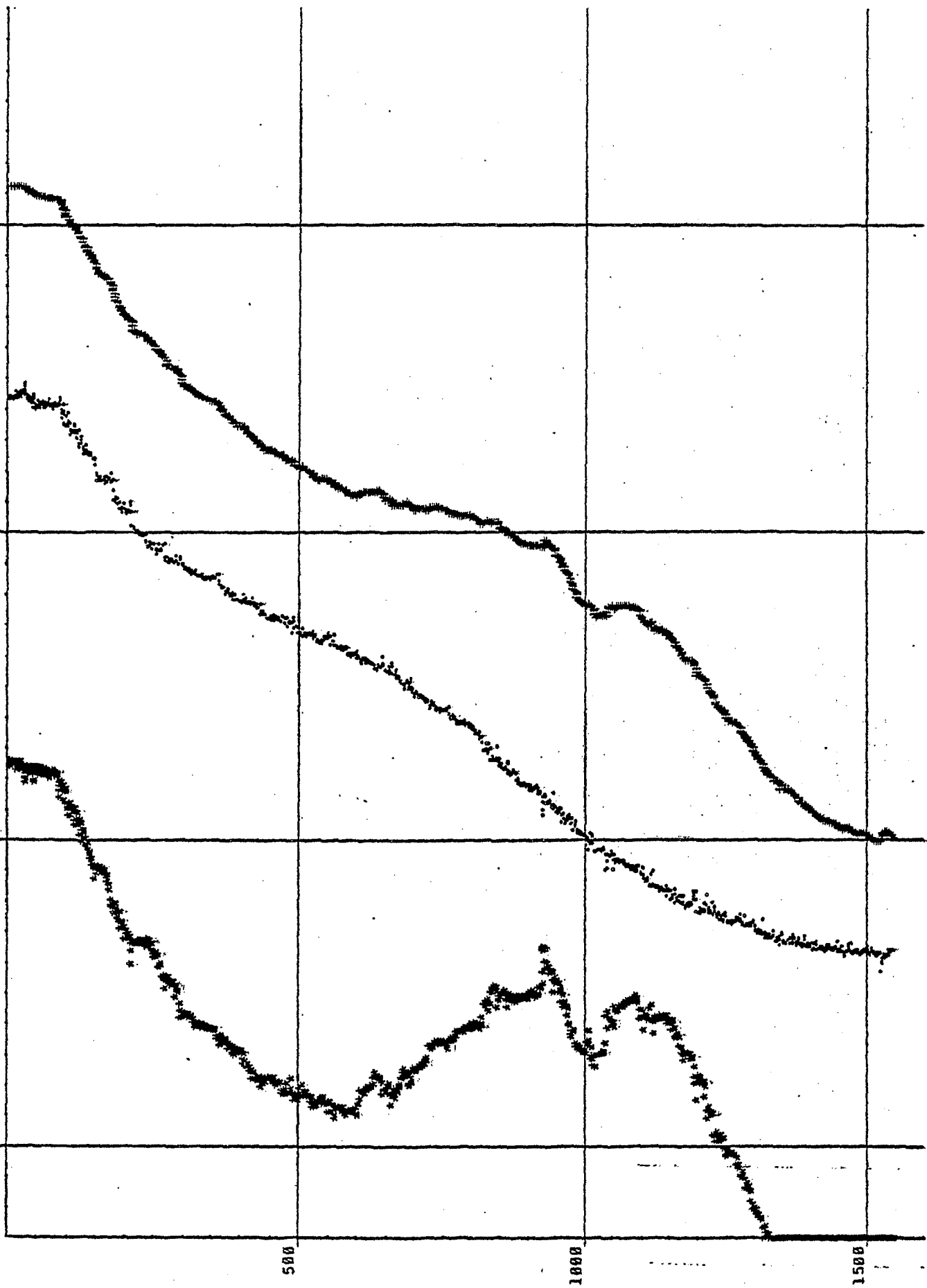


POSEIDON B6 DATE: 11. 4.82 STATION: 335 PROFILE: 7B

D0= 2.0 D0

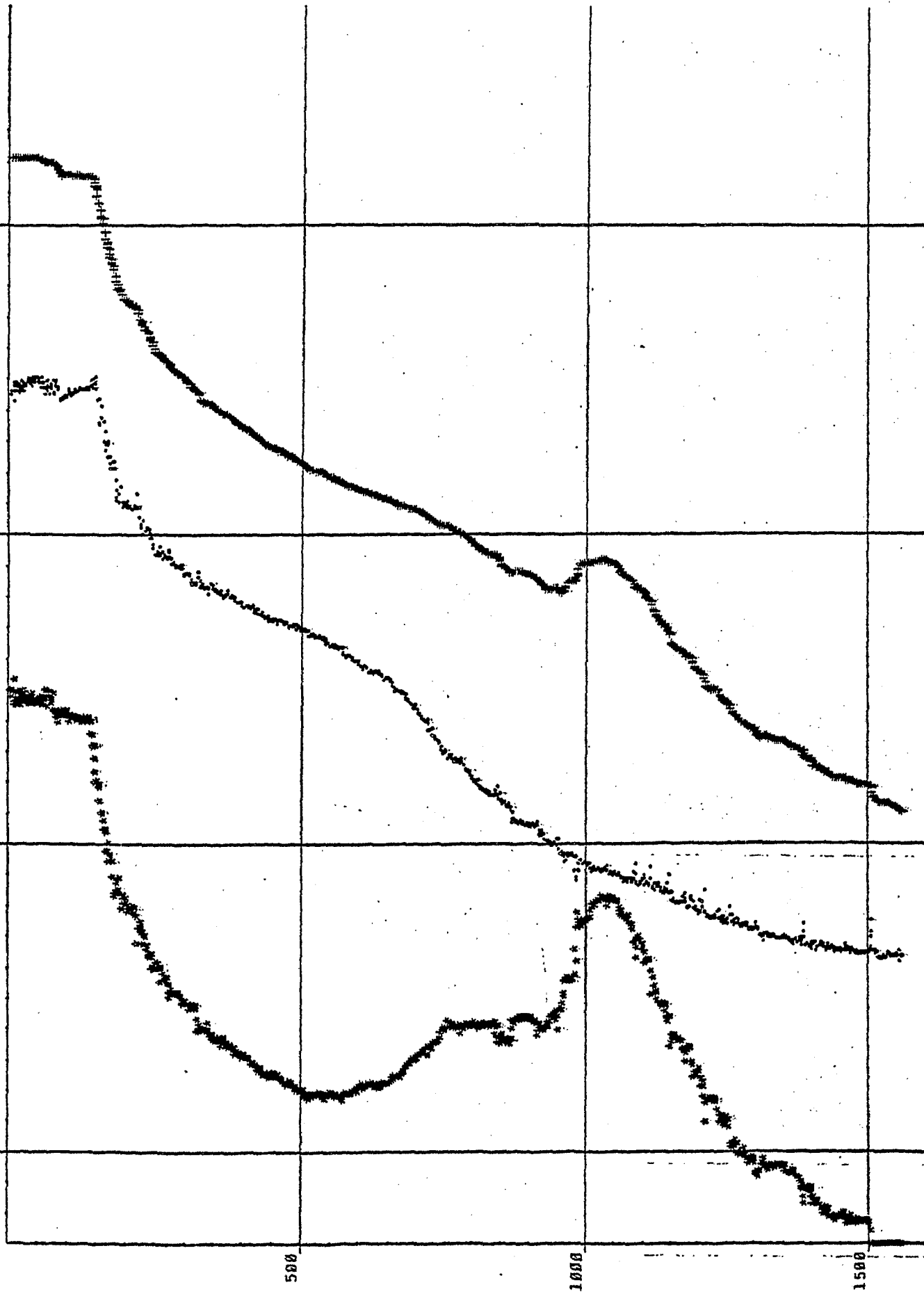
S0= 35.5 36.0 36.5 37.0 S0

T0= 0 5 10 15 T0

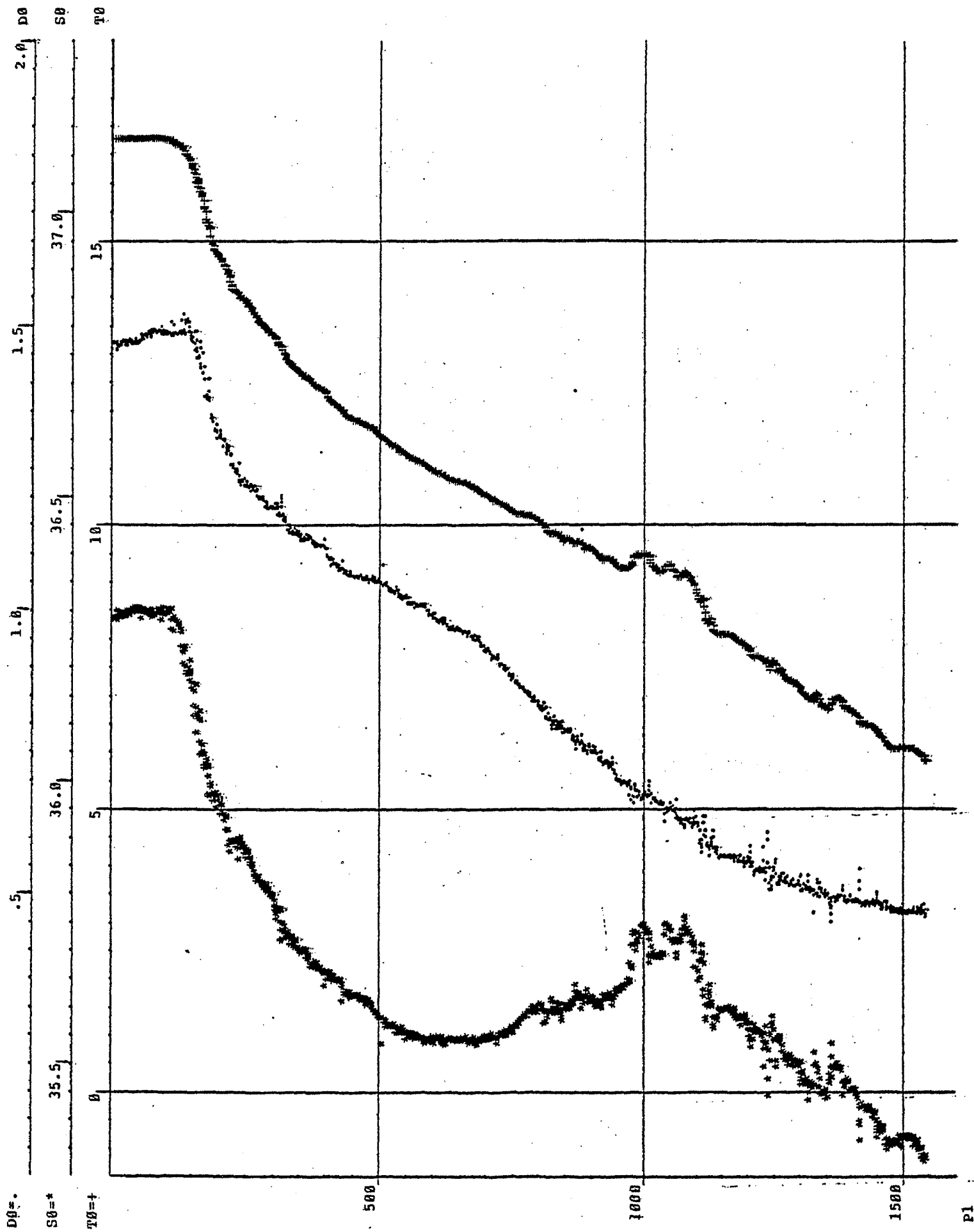


POSEIDON 86 DATE: 11. 4.82 STATION: 336 PROFILE: 79

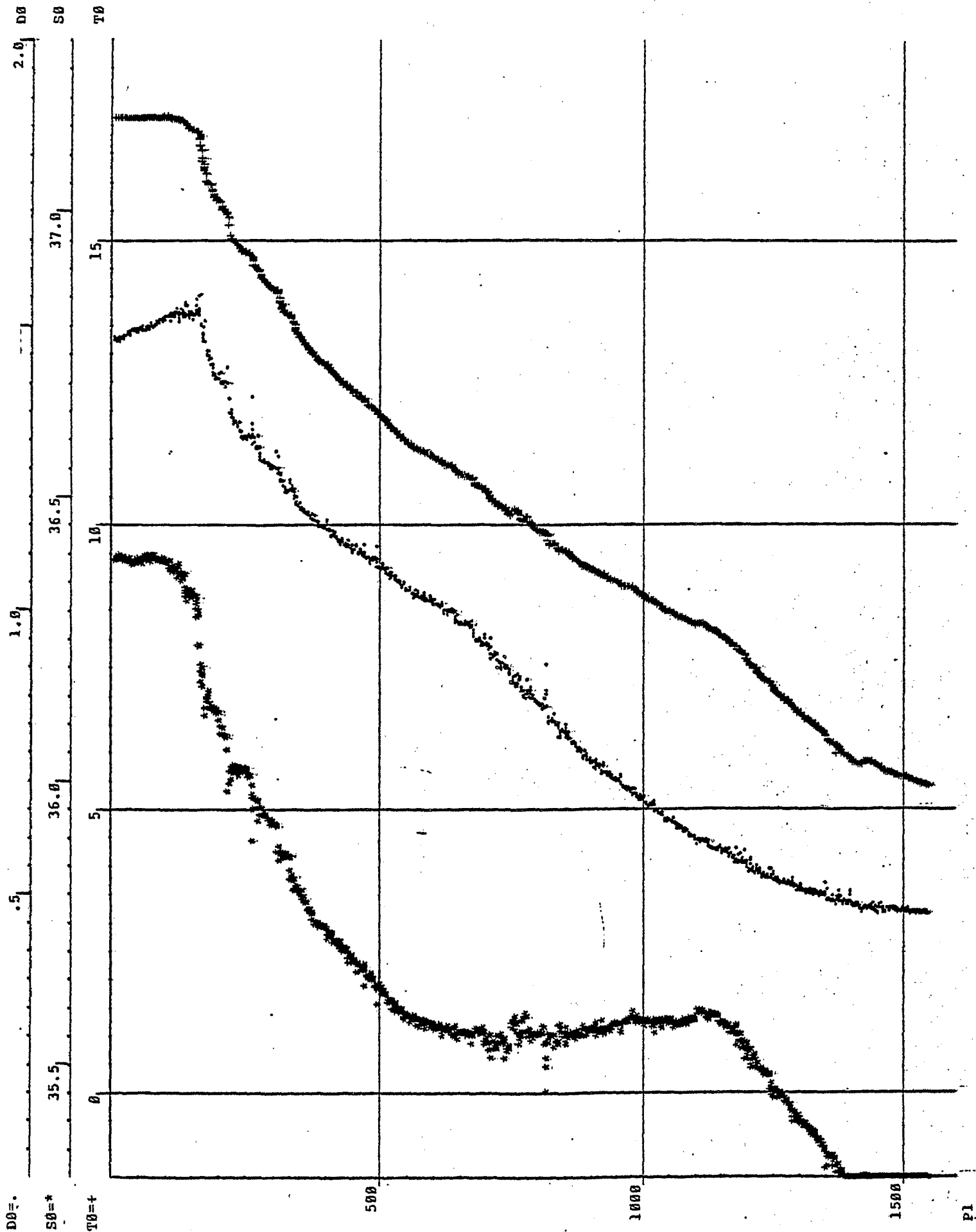
DQ=-. 35.5 36.0 36.5 37.0 2.0 DQ
S0=+ 35.5 36.0 36.5 37.0 S0
T0=+ 0 5 10 15 T0



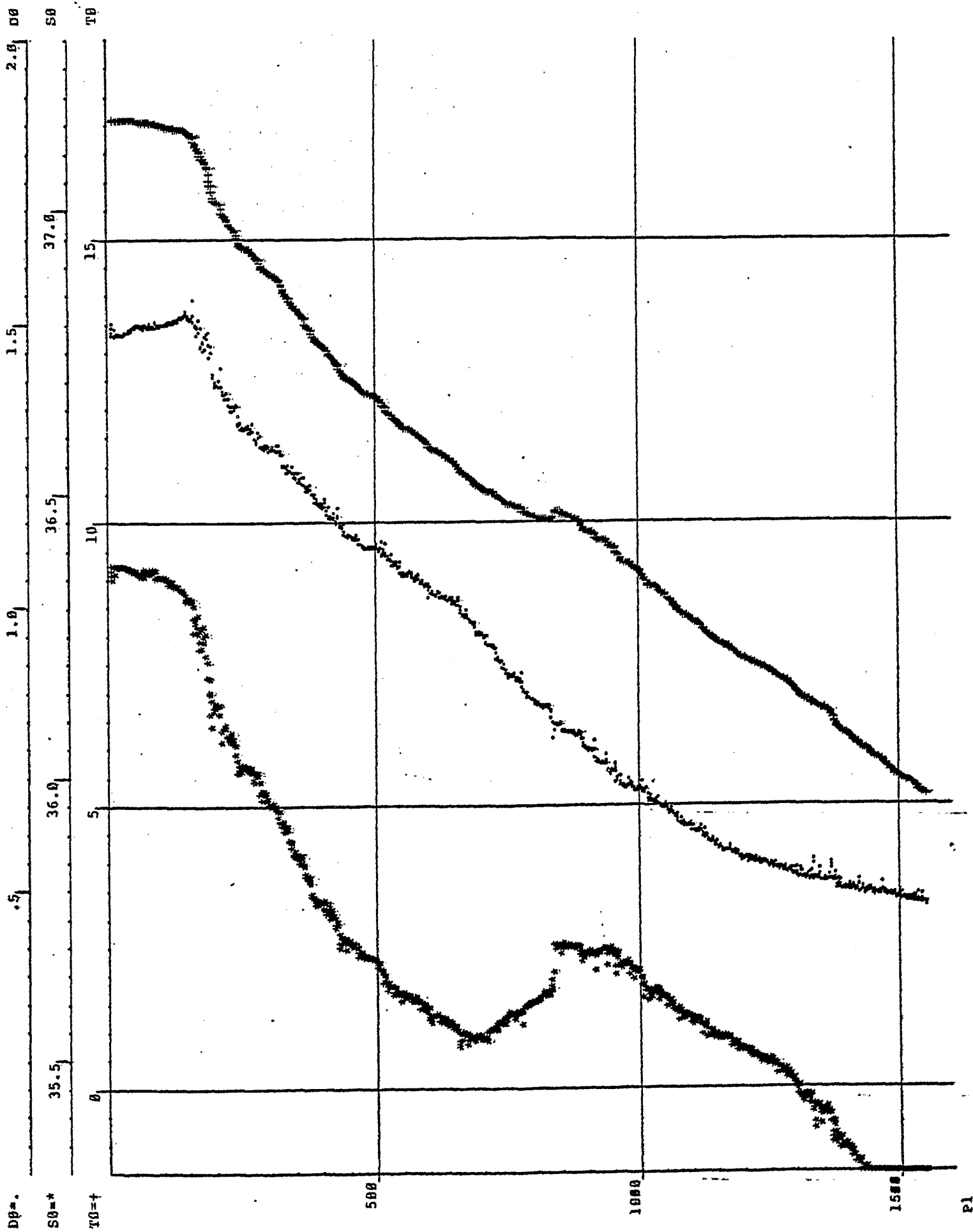
POSEIDON 86 DATE: 11. 4.82 STATION: 337 PROFILE: 86



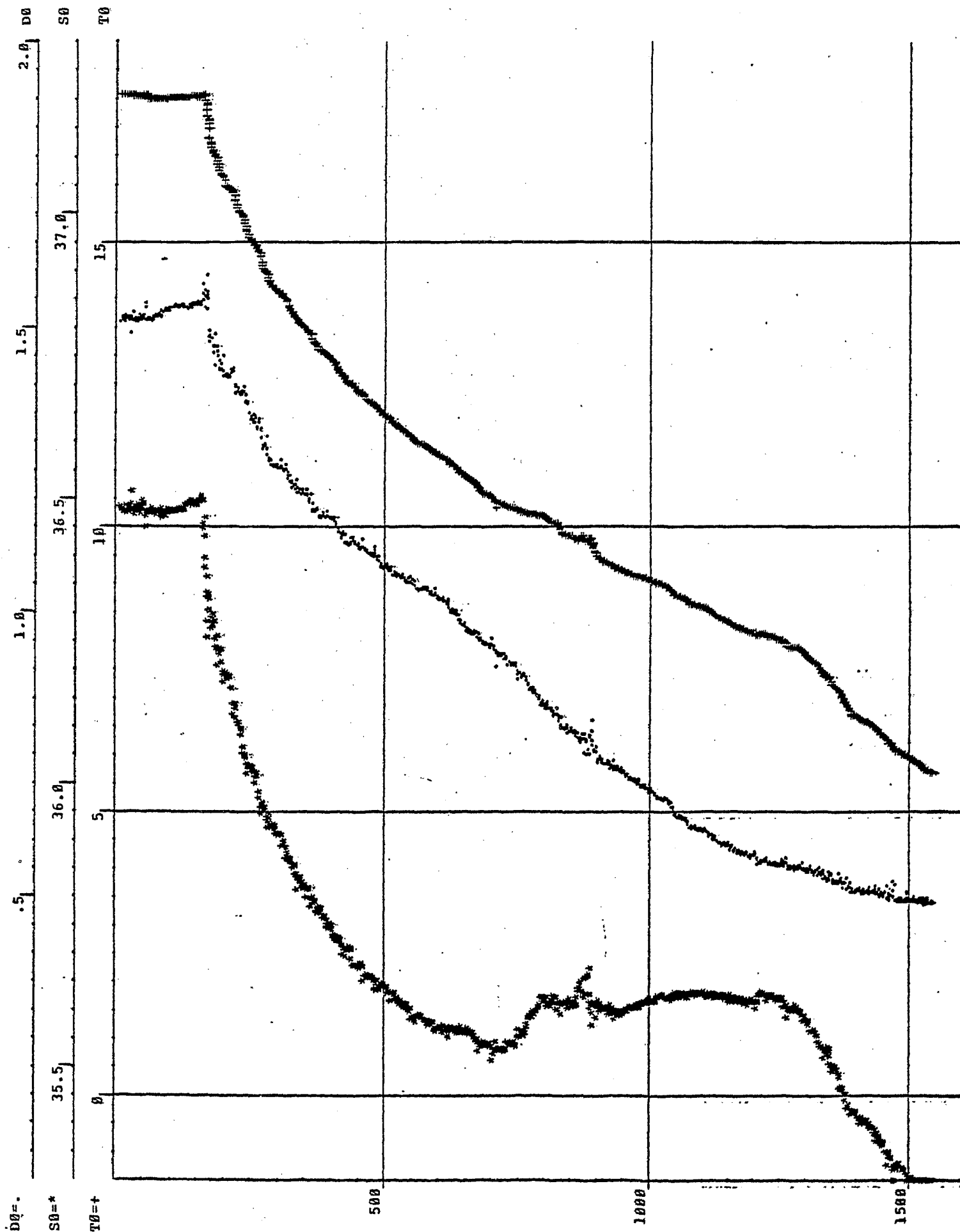
POSEIDON 86 DATE: 11. 4.82 STATION: 338 PROFILE: 81



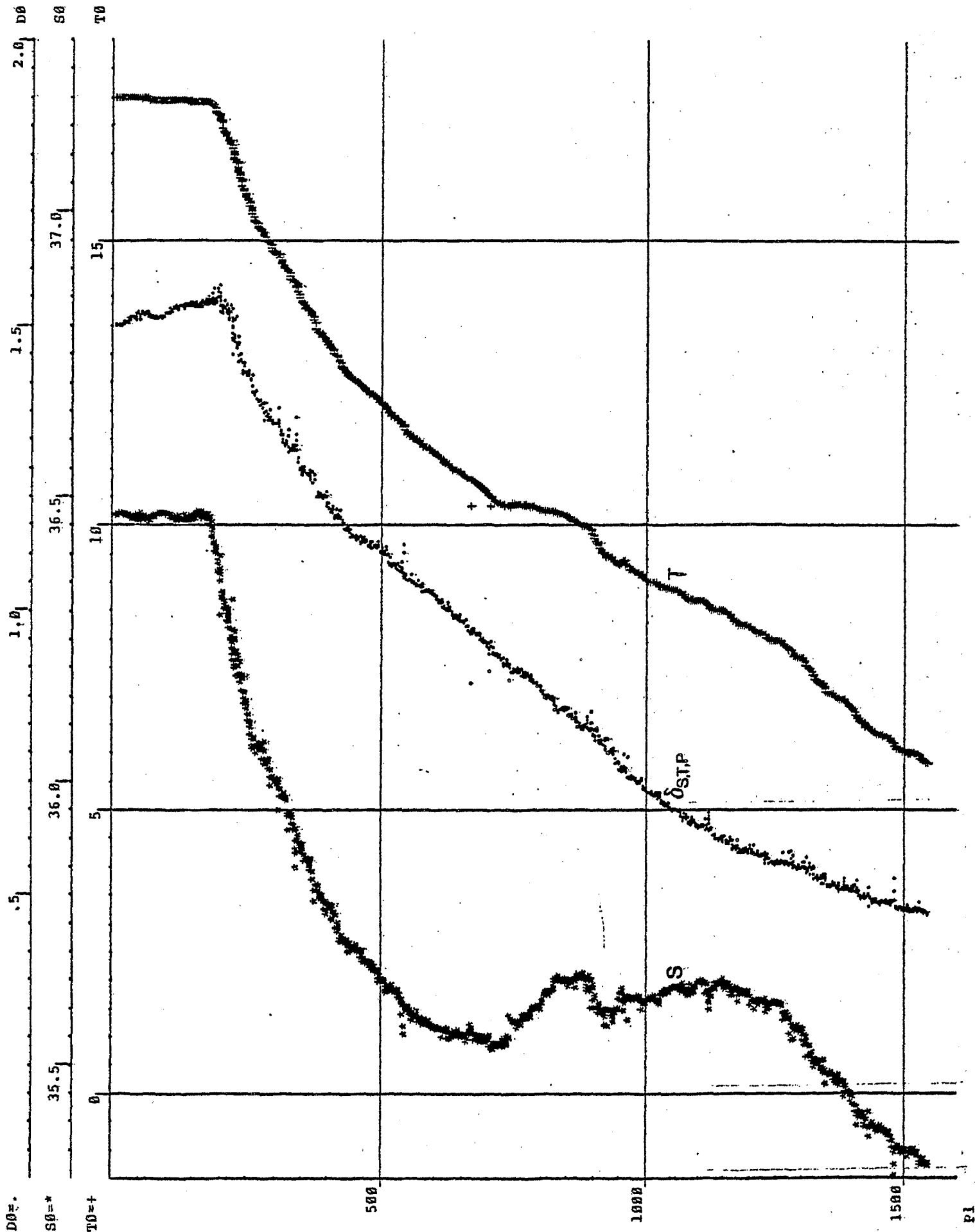
POSEIDON 86 DATE: 11. 4.82 STATION: 339 PROFILE: 82



POSEIDON 86 DATE: 11. 4.82 STATION: 348 PROFILE: 83

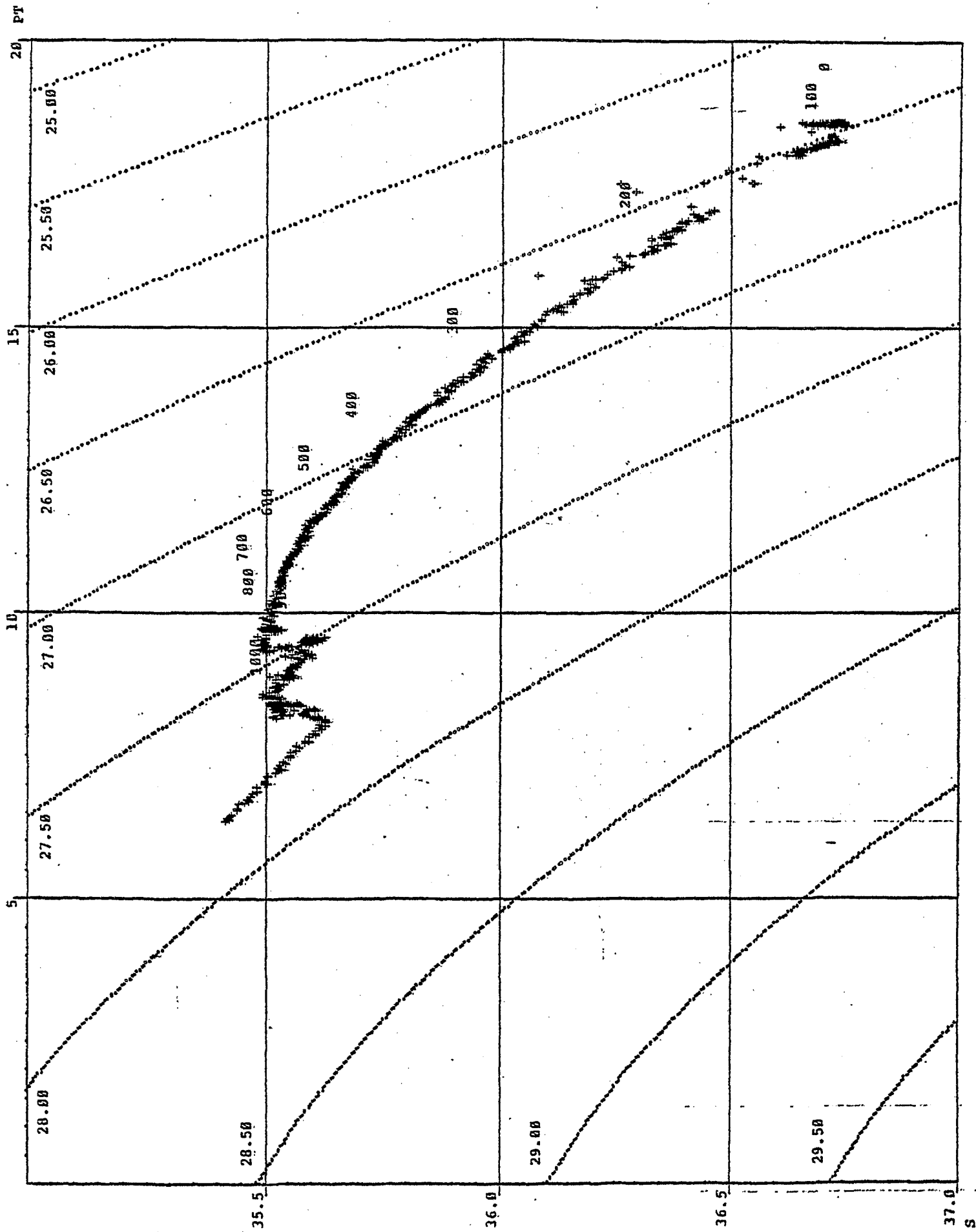


POSEIDON B6 DATE: 11. 4.82 STATION 341 PROFILE: B4

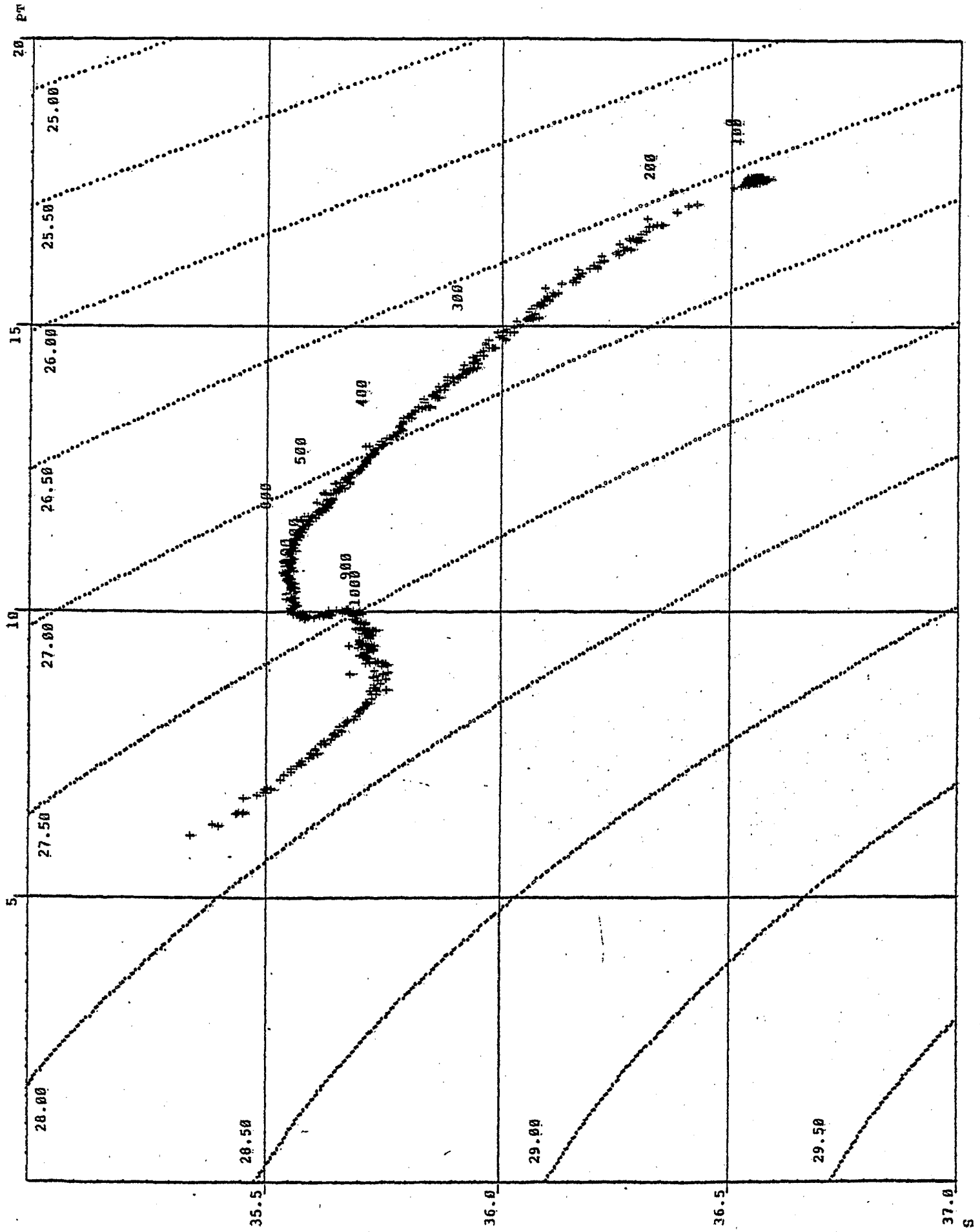


T/S - DIAGRAMMES

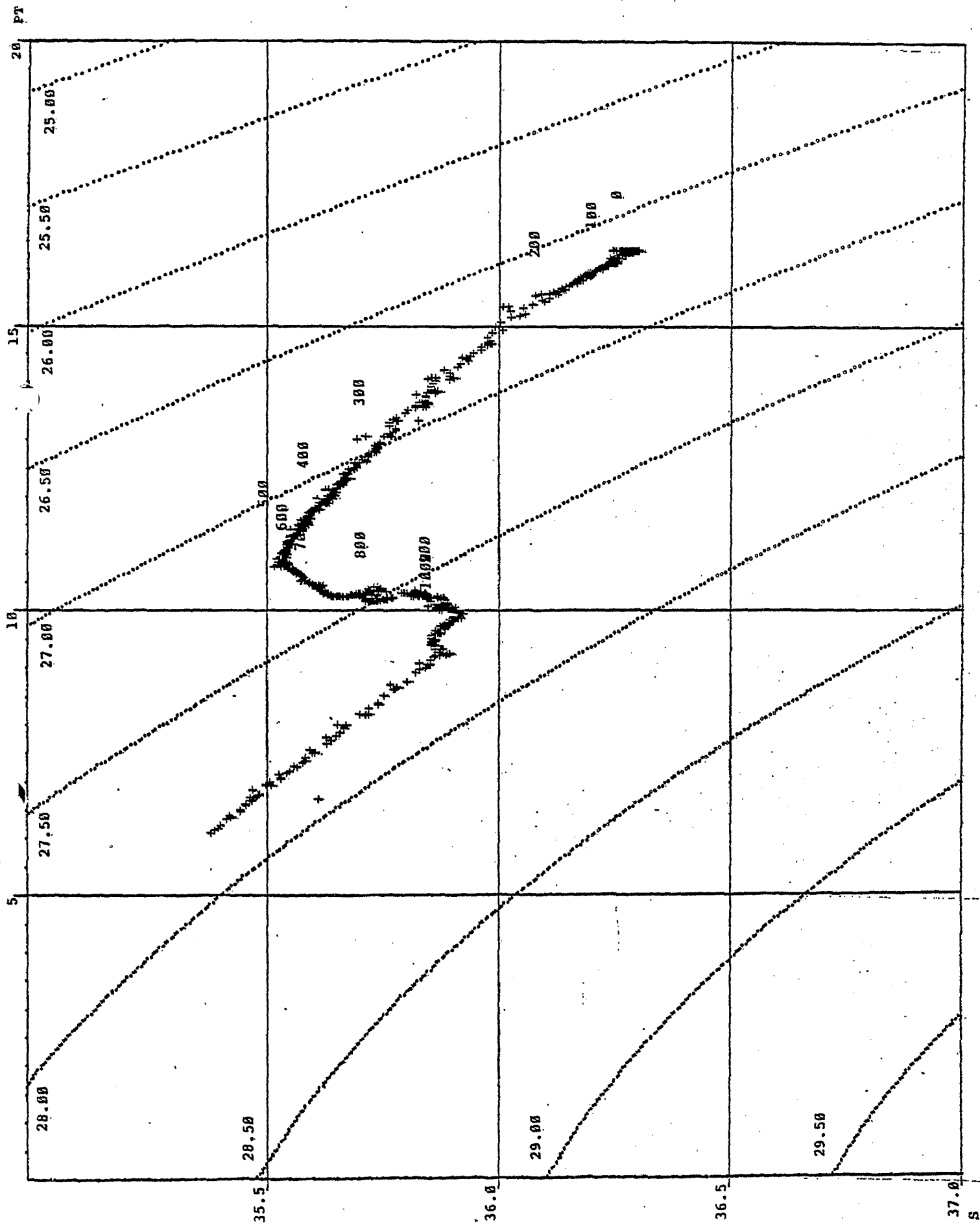
POSEIDON 86 DATE: 26, 3.82 STATION: 259 PROFILE: 4



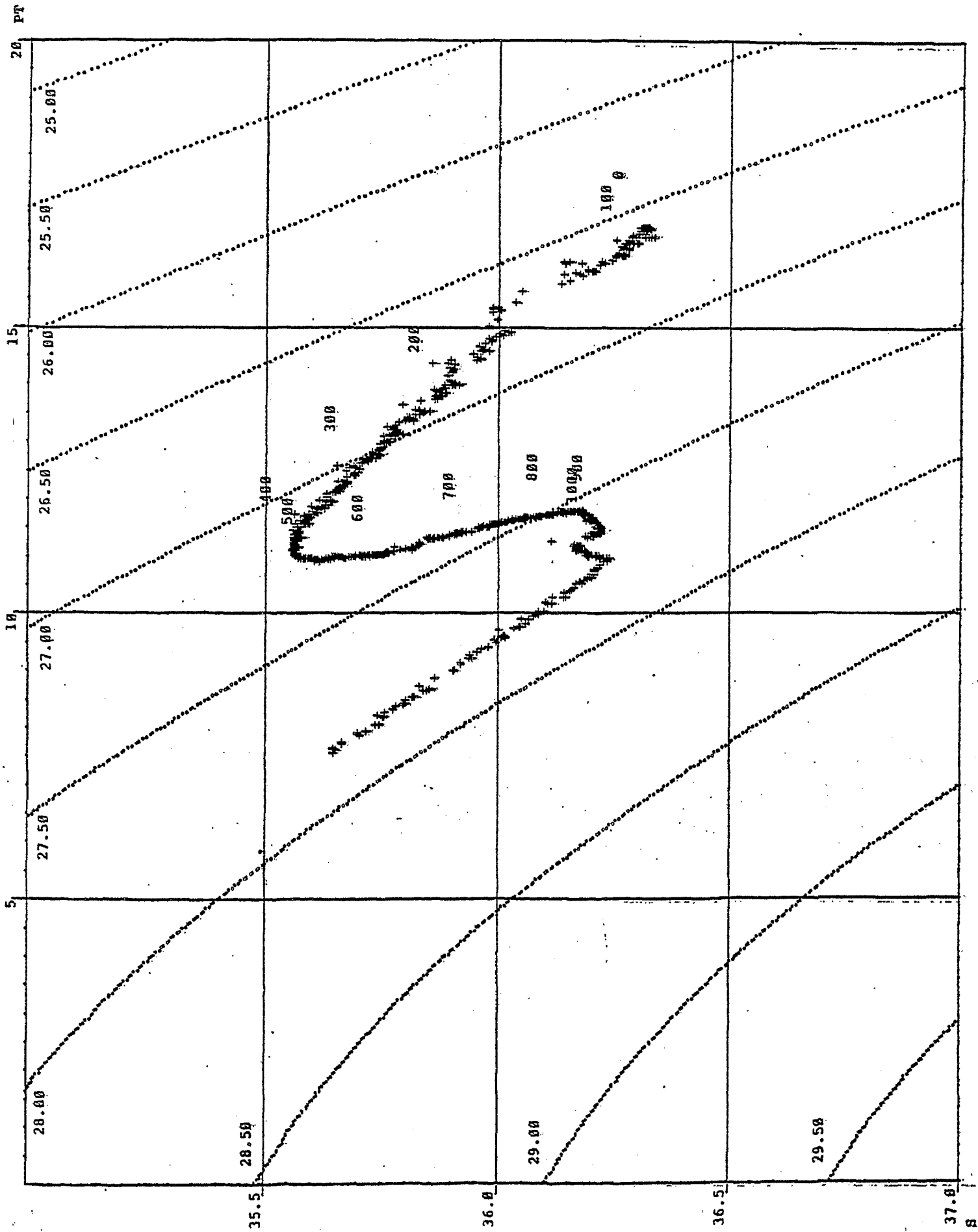
POSEIDON 86 DATE: 27. 3.82 STATION: 262 PROFILE:



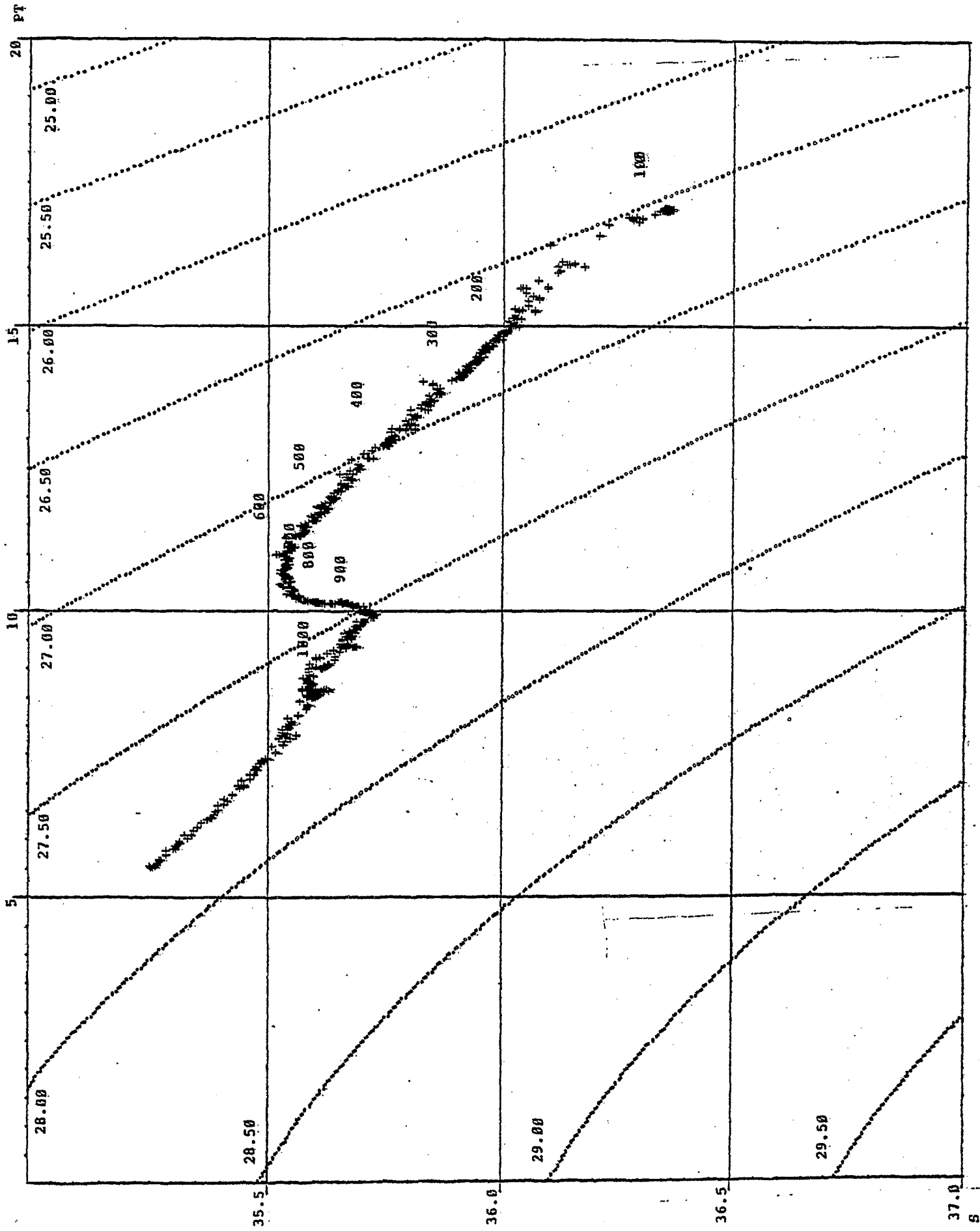
POSEIDON R6 DATE: 28. 3.82 STATION: 200



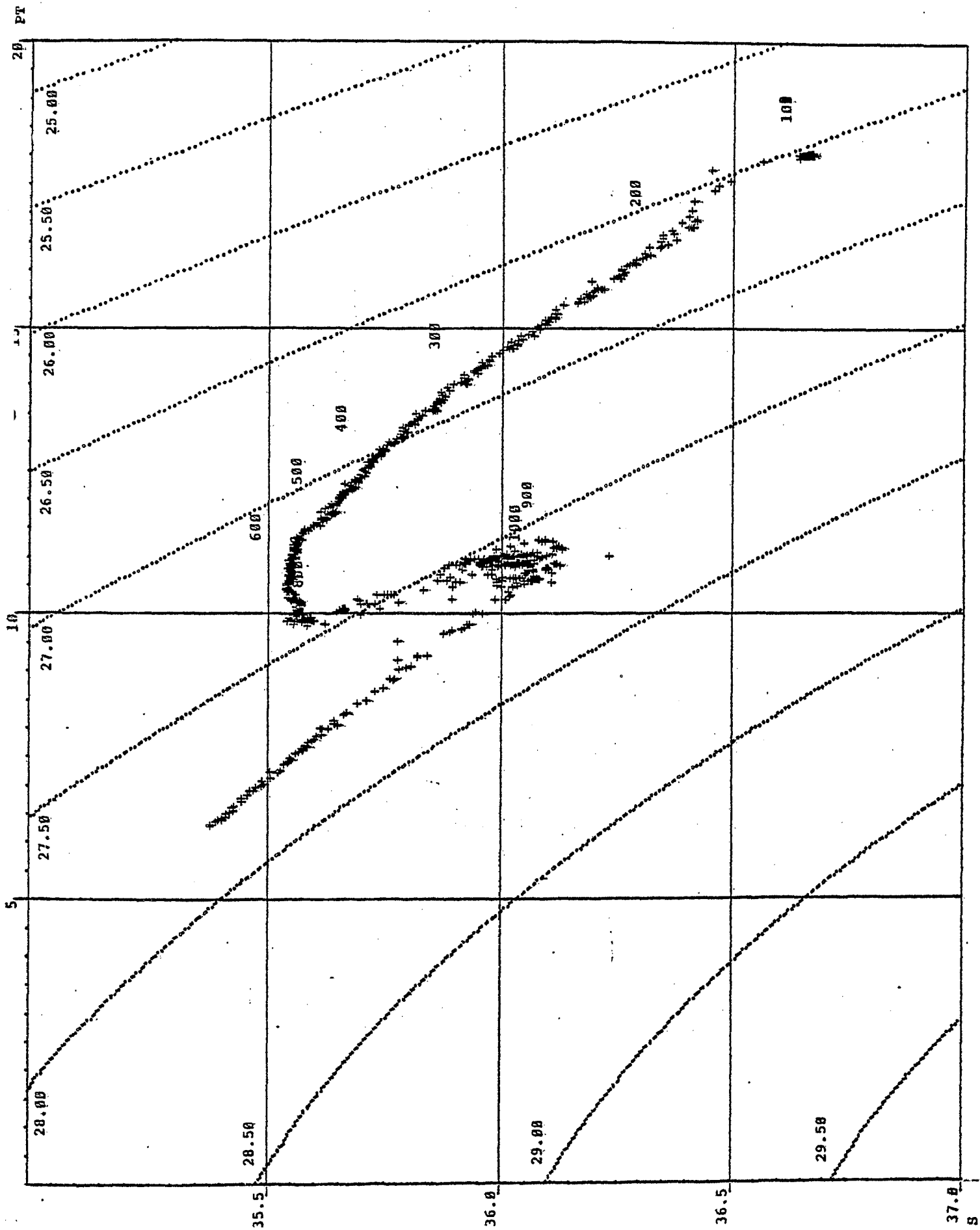
POSEIDON 86 DATE: 28. 3.02 STATION: 268 PROFILE: 13



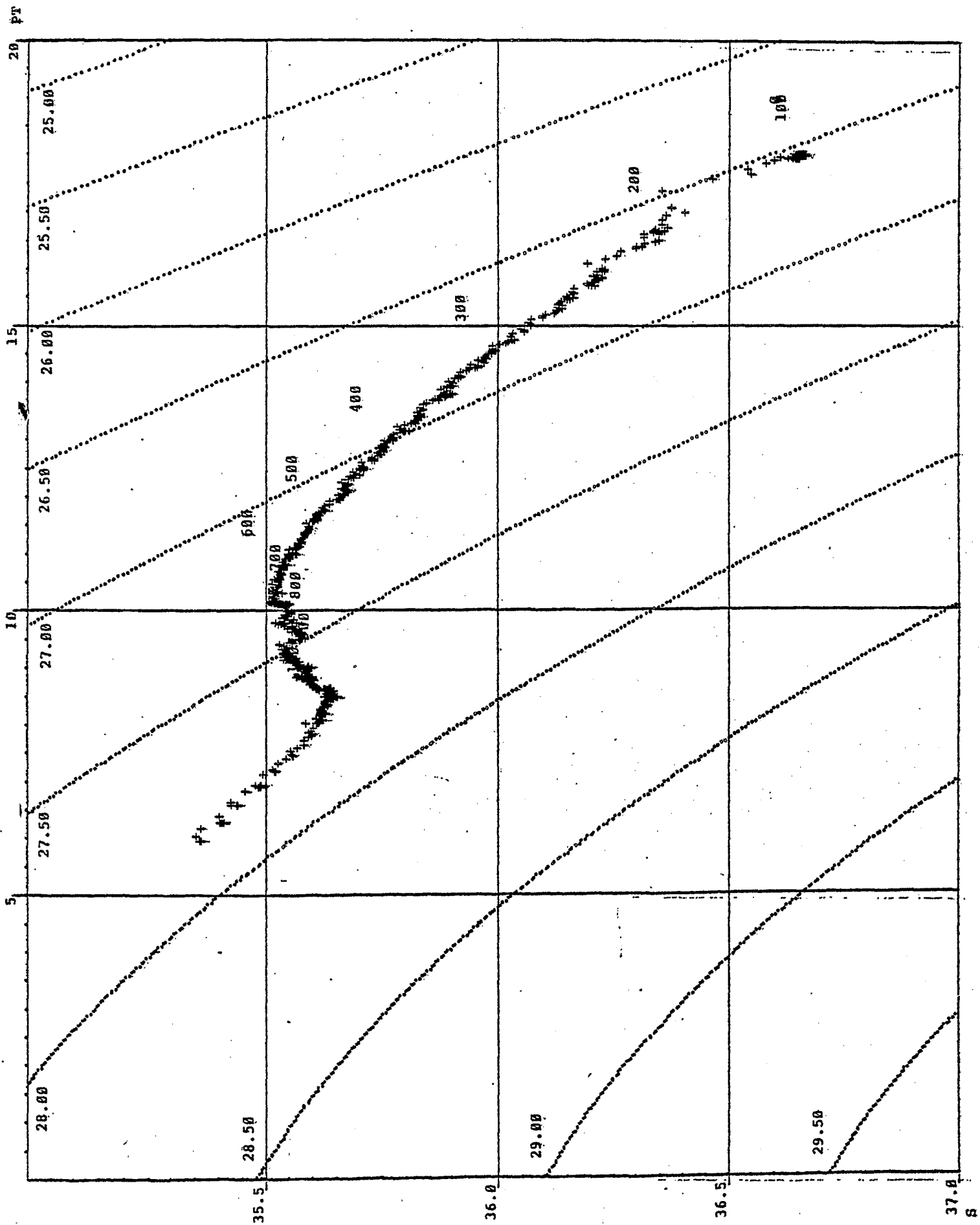
POSEIDON 86 DATE: 29, 3.82 STATION: 271 PROFILE: 16



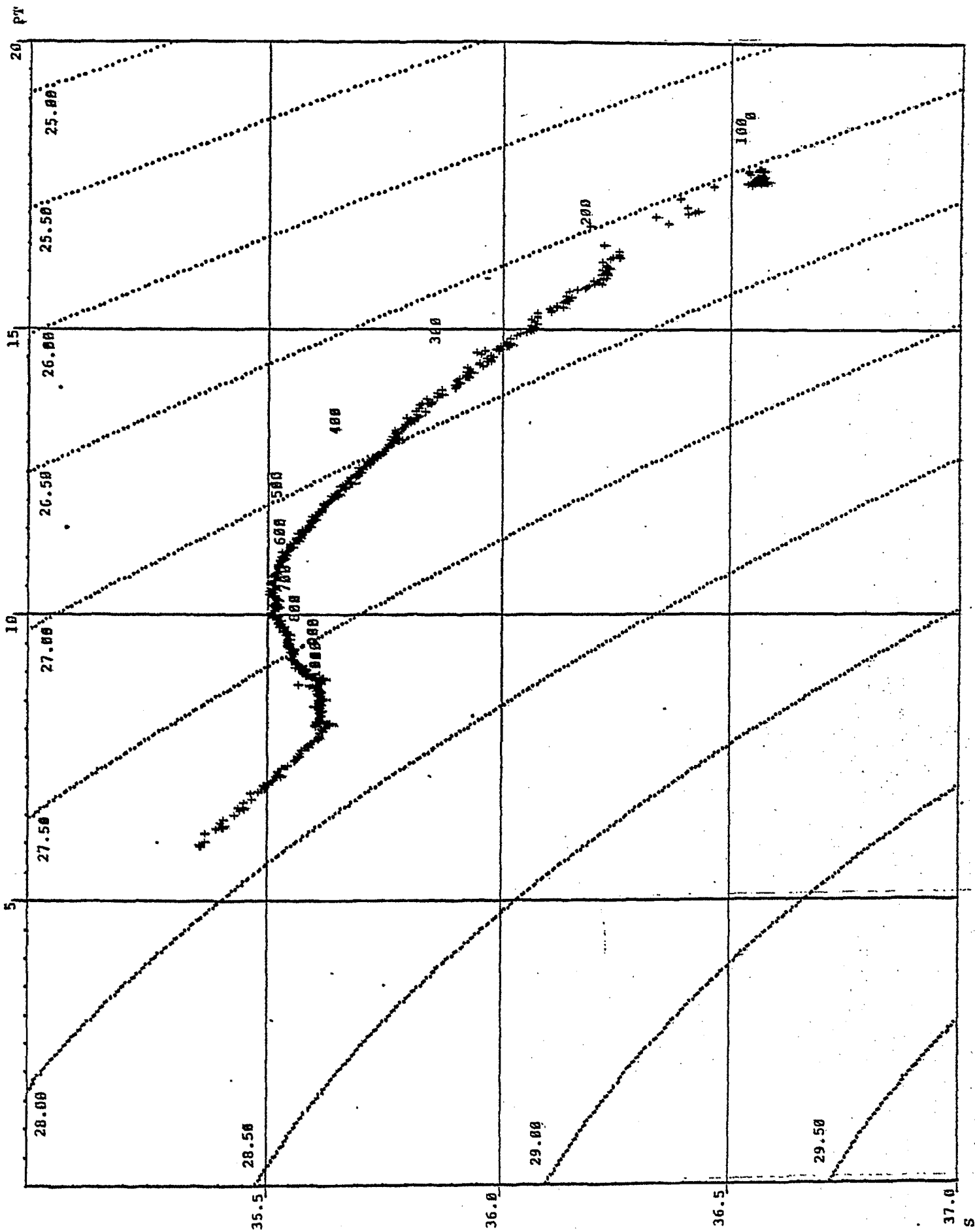
POSEIDON 86 DATE: 31. 3.82 STATION: 280 PROFILE: 25



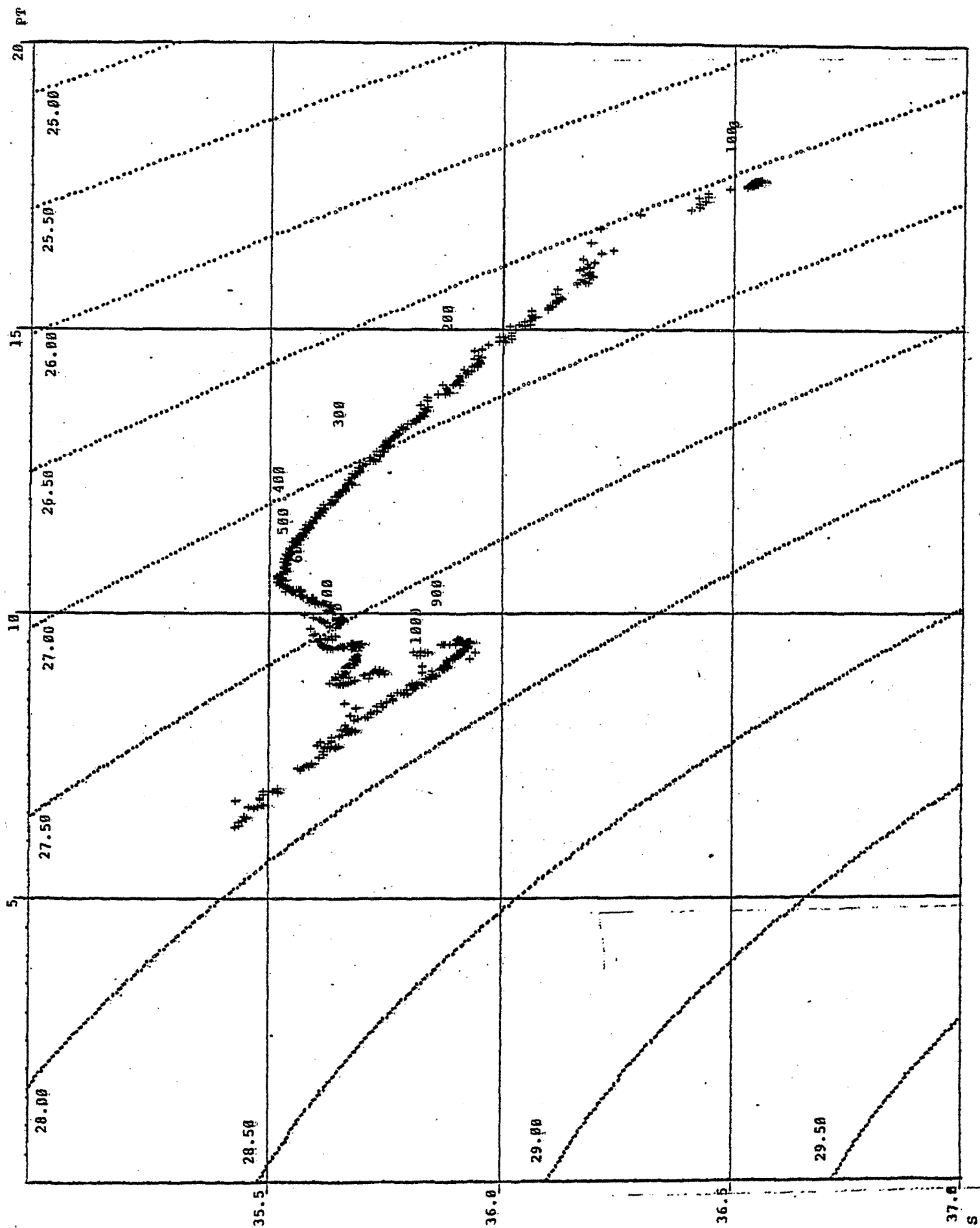
POSEIDON 86 DATE: 31, 1. HZ SURF TIDE 402



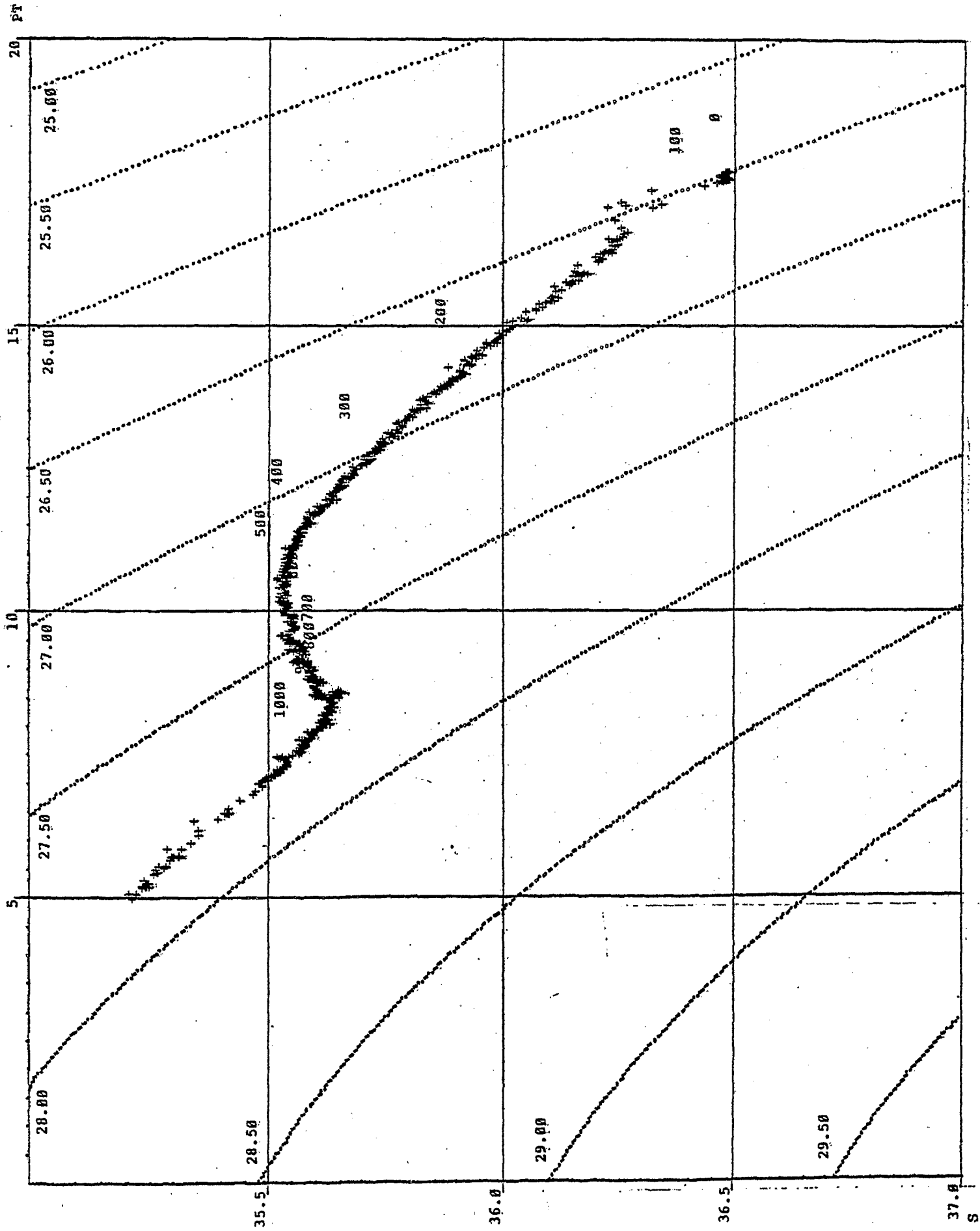
POSEIDON 66 DATE: 1. 4.62 STATION: 280 PROFILE: 33



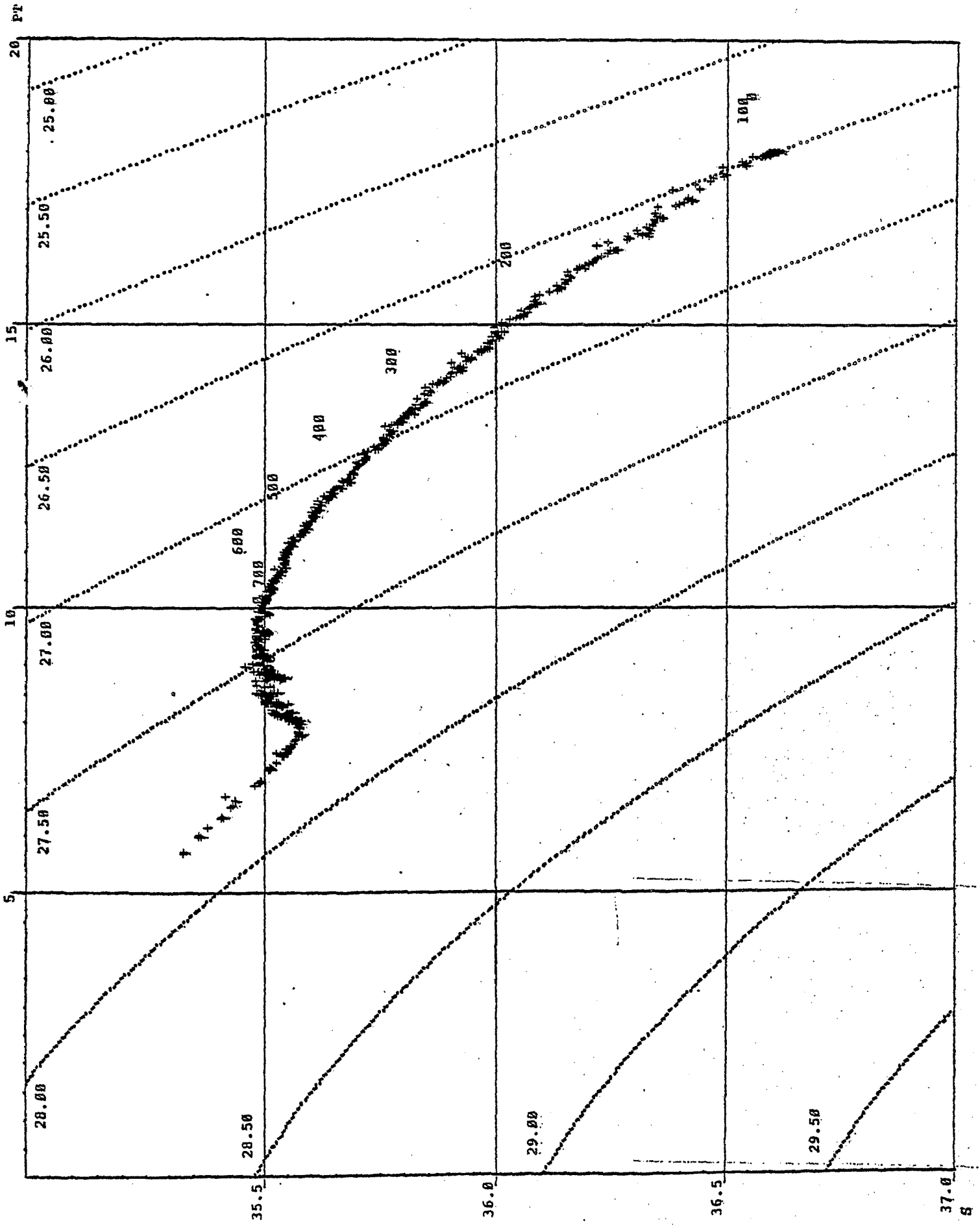
POSEIDON 86 DATE: 2. 4.82 STATION: 291 PROFILE: 36



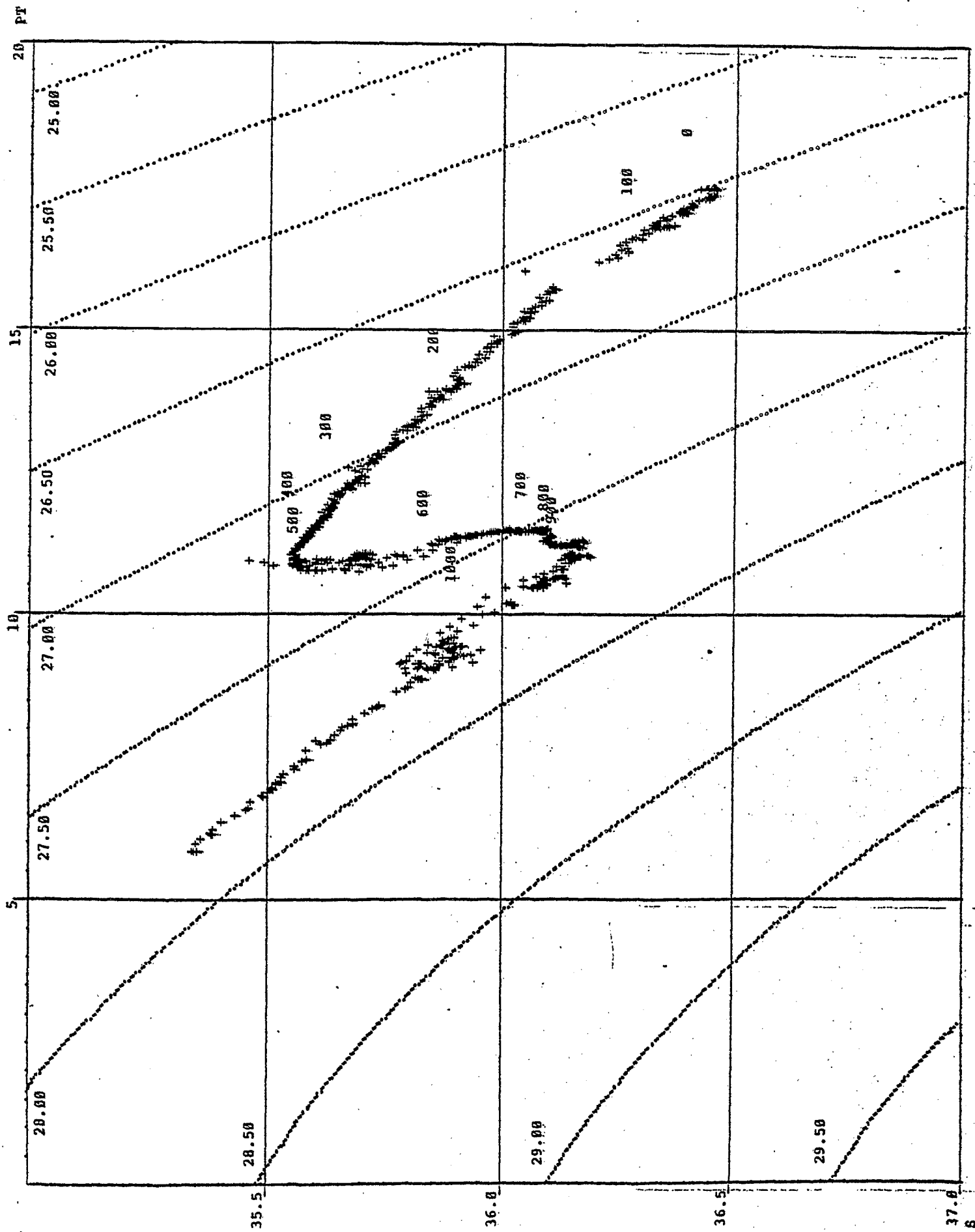
POSEIDON 86 DATE: 4. 4.82 STATION: 299 PROFILE: 43



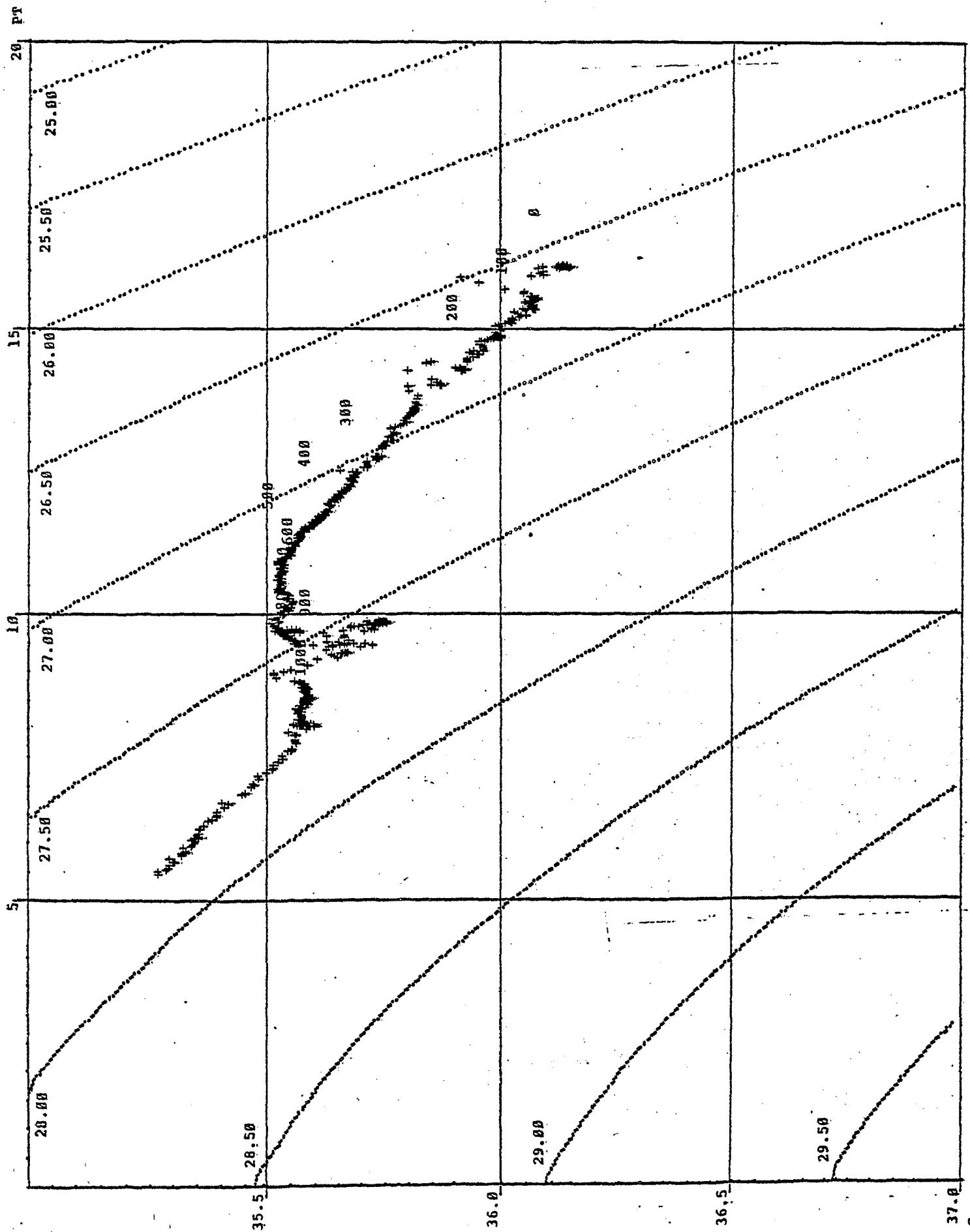
POSEIDON 86 DATE: 6, 4.82 STATION: JII



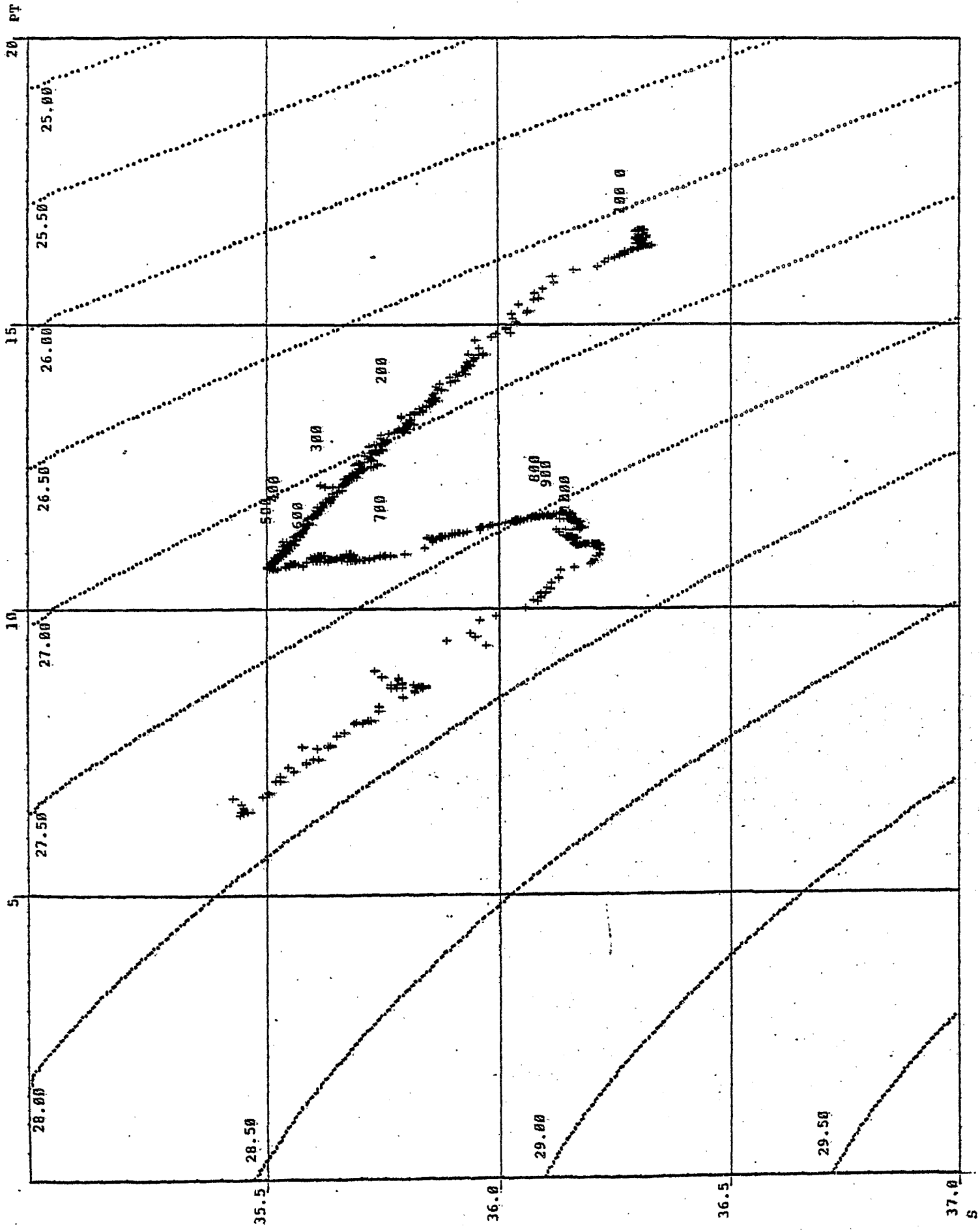
POSEIDON 86 DATE: 7. 4.82 STATION: 315 PROFILE: 59



POSEIDON 86 DATE: 8. 4.82 STATION: 322 PROFILE: 66

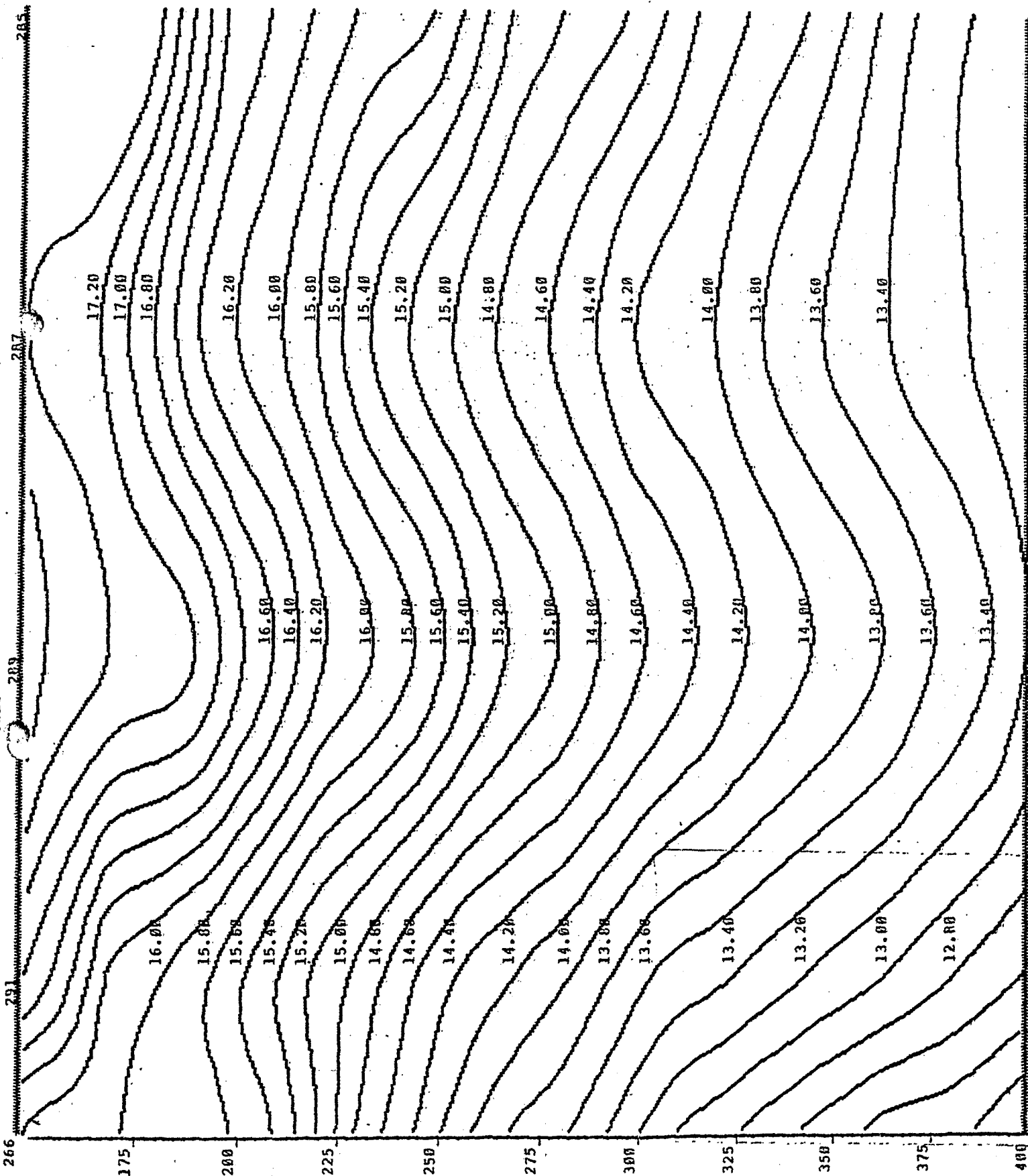


POSEIDON 06 DATE: 9. 4.82 STATION: 329 PROFILE: 72

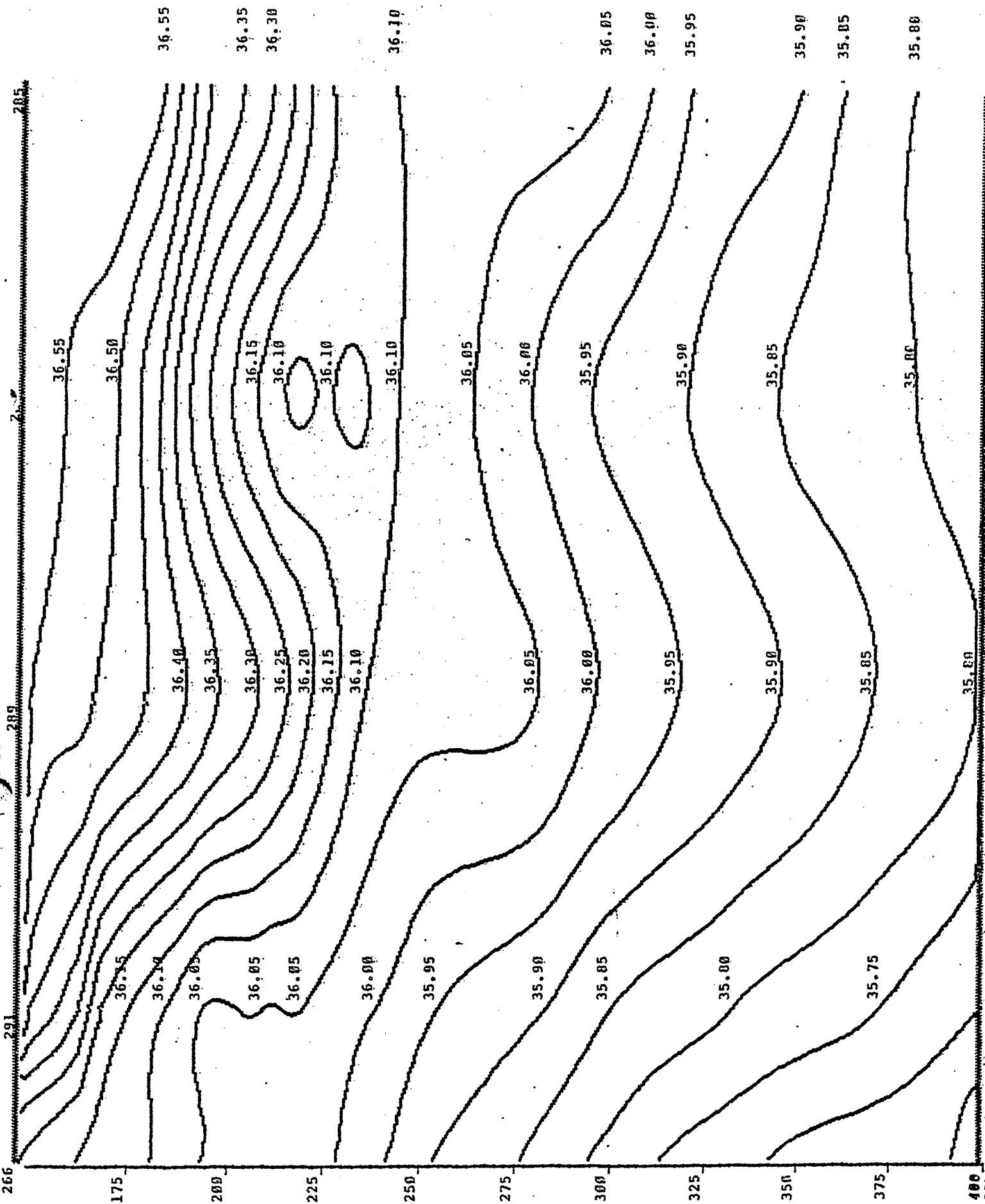


VERTICAL SECTIONS

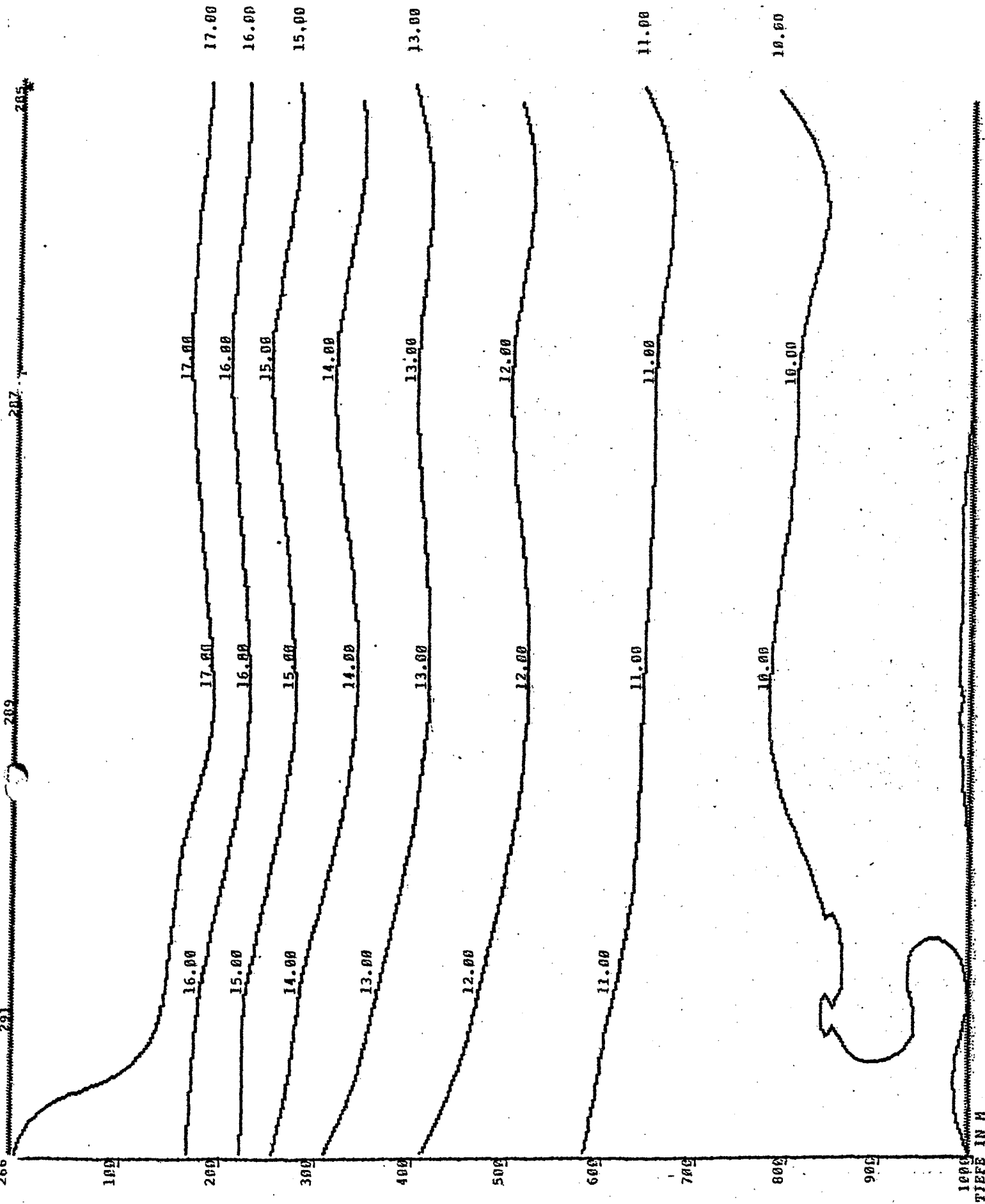
POSEIDON 86 SCHNITT F, NORD - SÜD AUF 19:36 WEST
VERTIKALSCHNITT VON T1 MIT ISOLINIENABSTAND .020



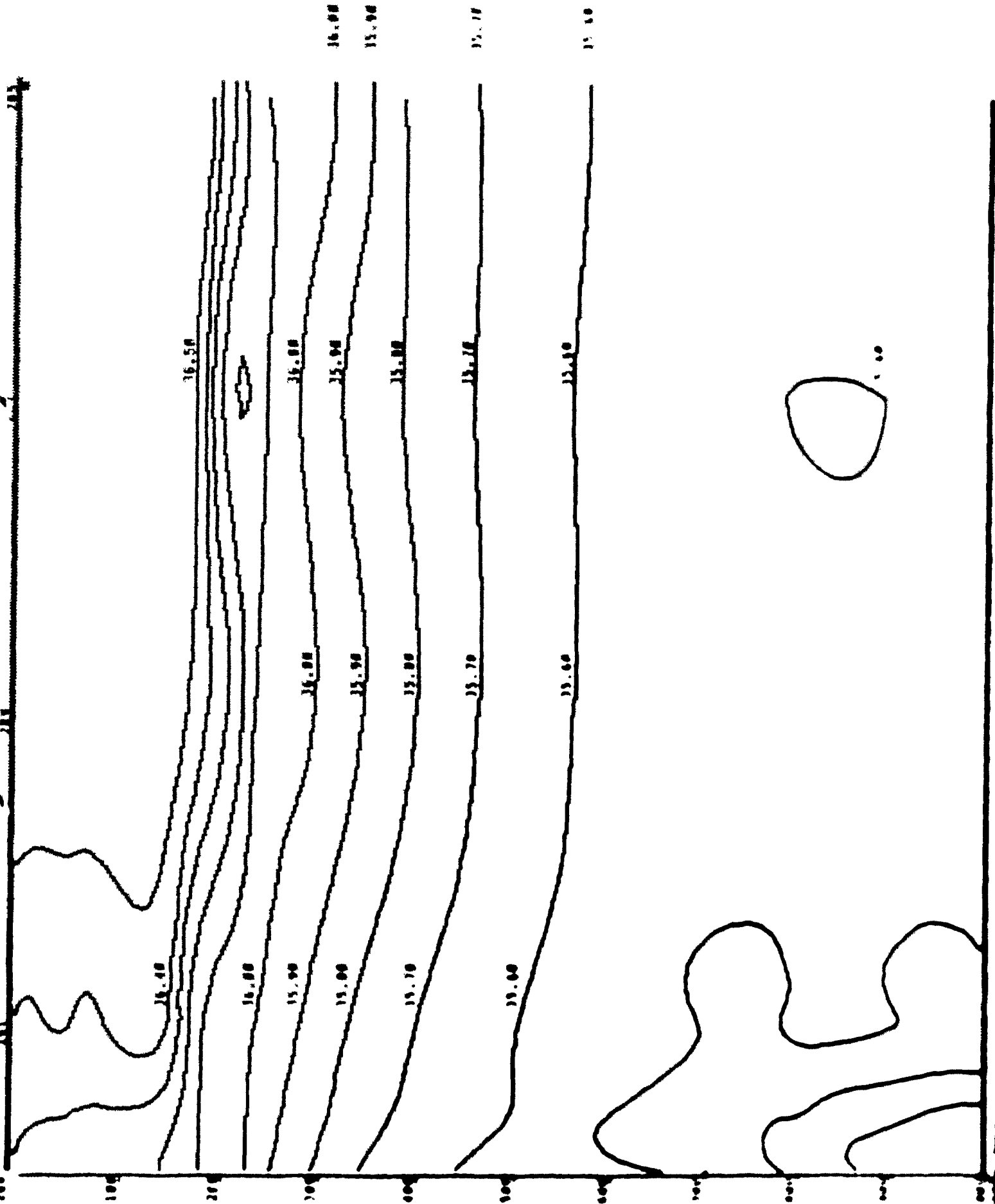
POSEIDON 06 SCHNITT F, NORD - SÜD AUF 19:36 WEST
VERTIKALSCHNITT VON S1 MIT ISOLINIENABSTAND 0.050



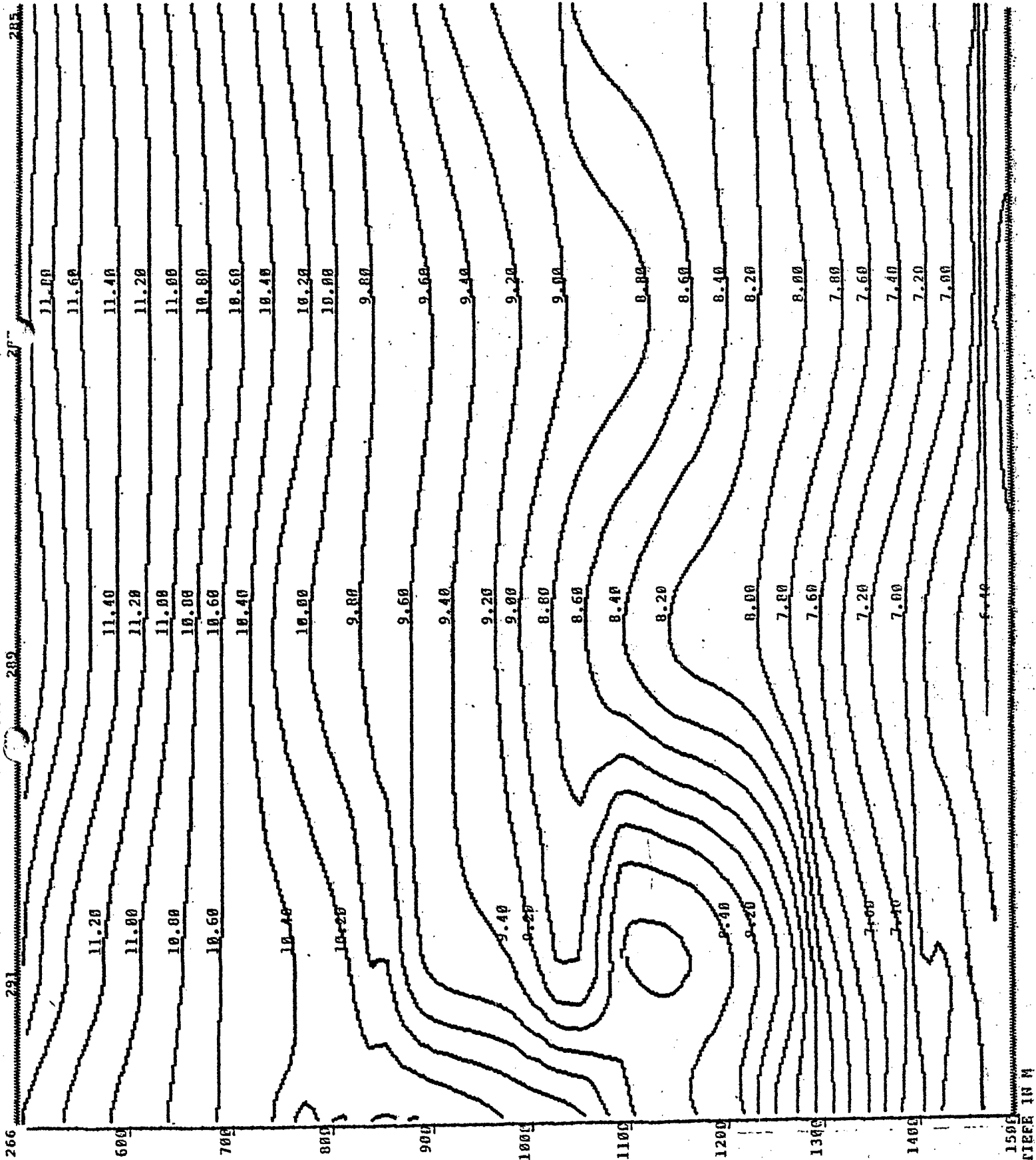
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PROFILING OF THE SURFACE OF THE EARTH BY MEANS OF A GRAVIMETER

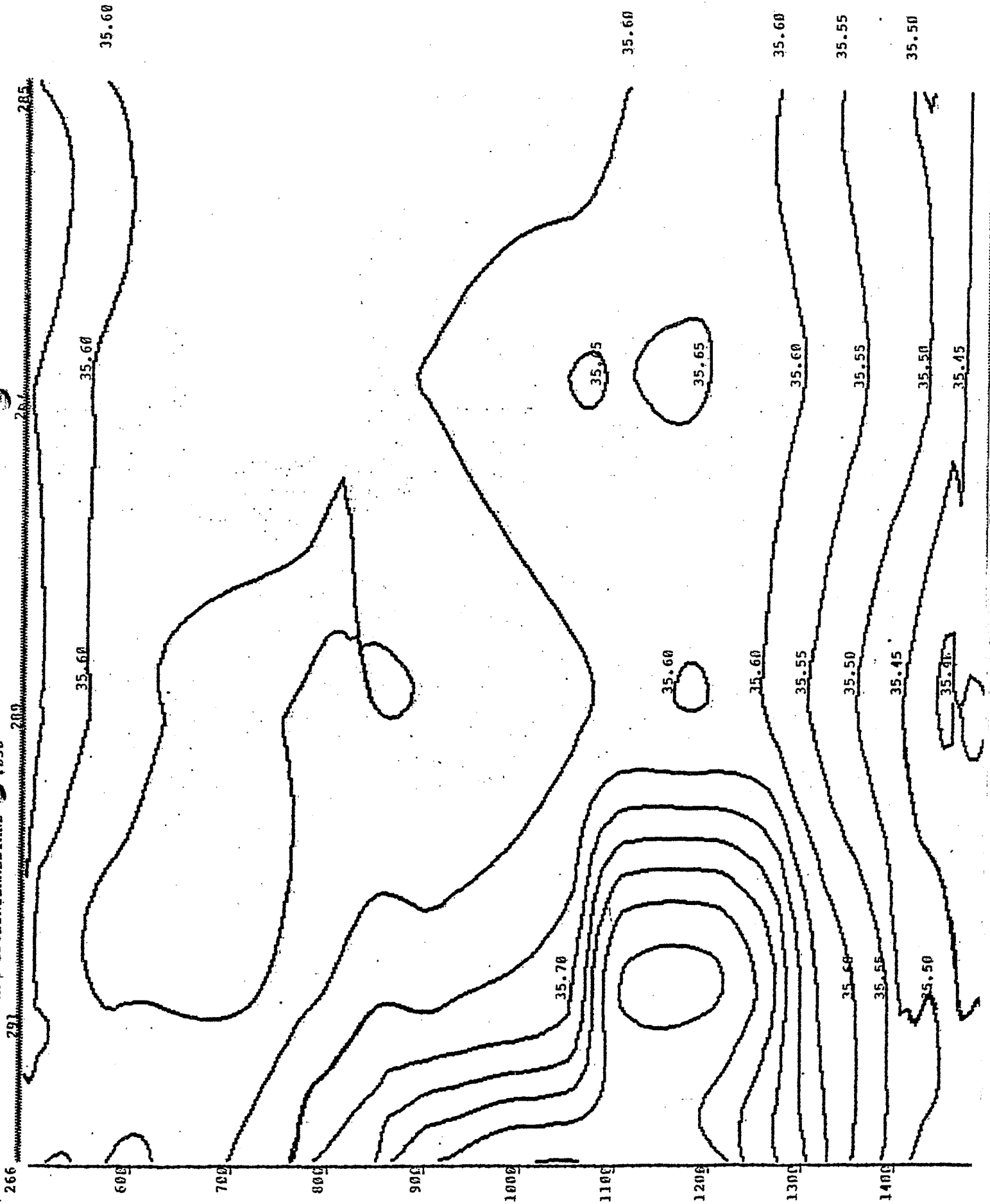


POSSIDON 56 SCHNITT E, NORD - SÜD AUF 19136 WEST
 VERTIKALSCHNITT VON T1 MIT ISOLINIENABSTAND .020

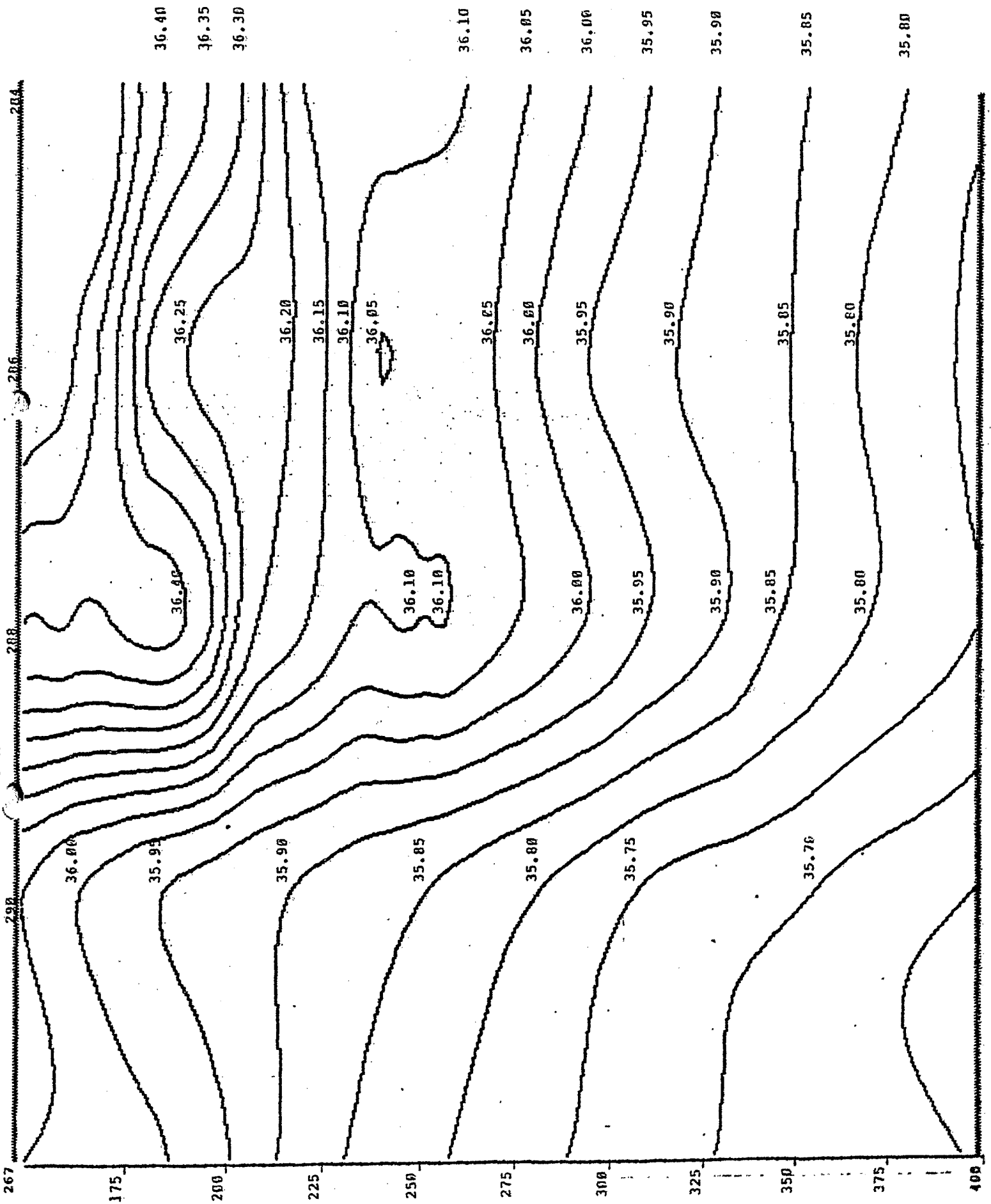


TIEFE IN M

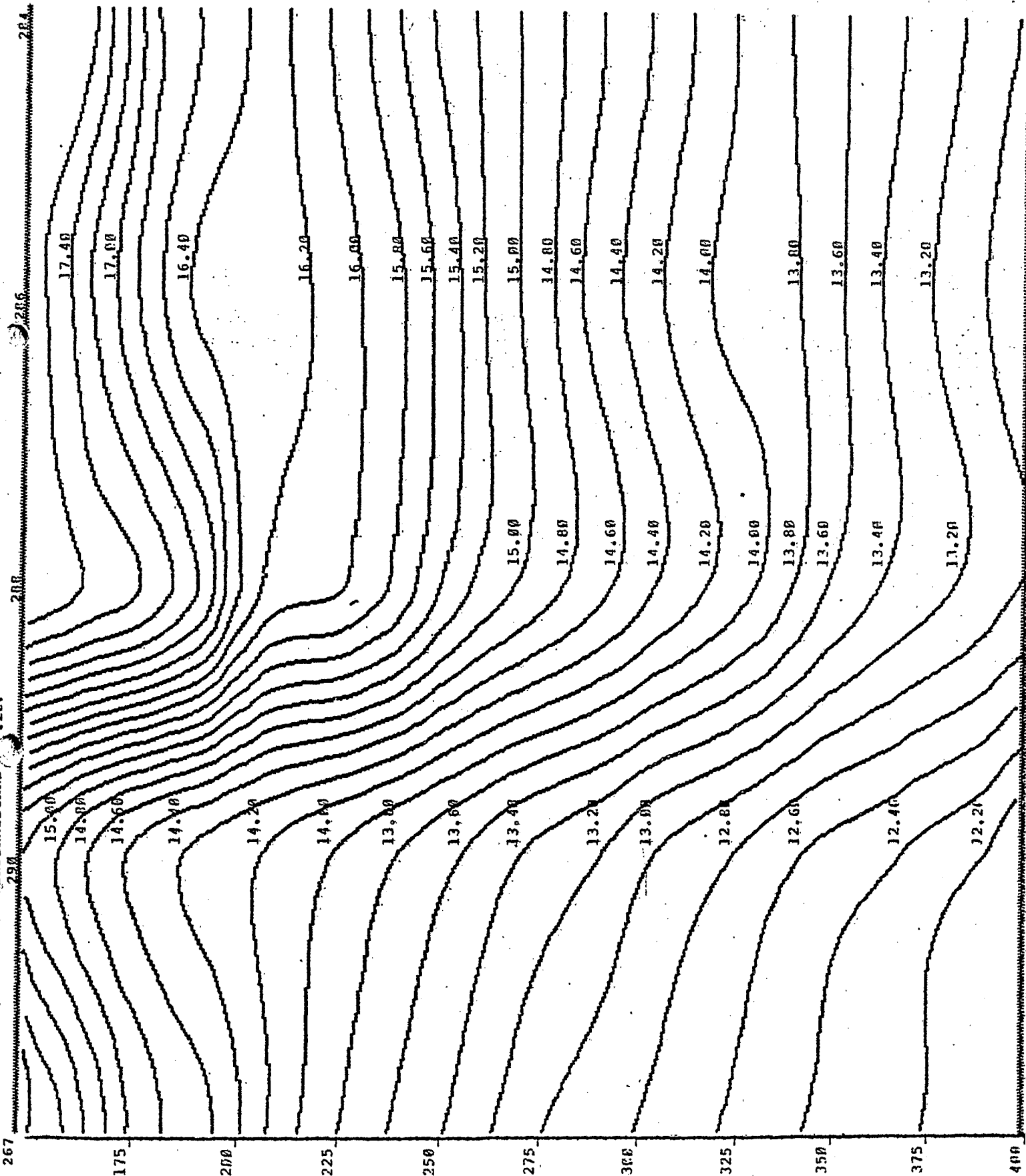
POSEIDON 86 SCHNITT F, NORD - SÜD AM 19:36 WEST
VERTIKALSCHNITT VON S1 MIT ISOLINIENABSTAND .050



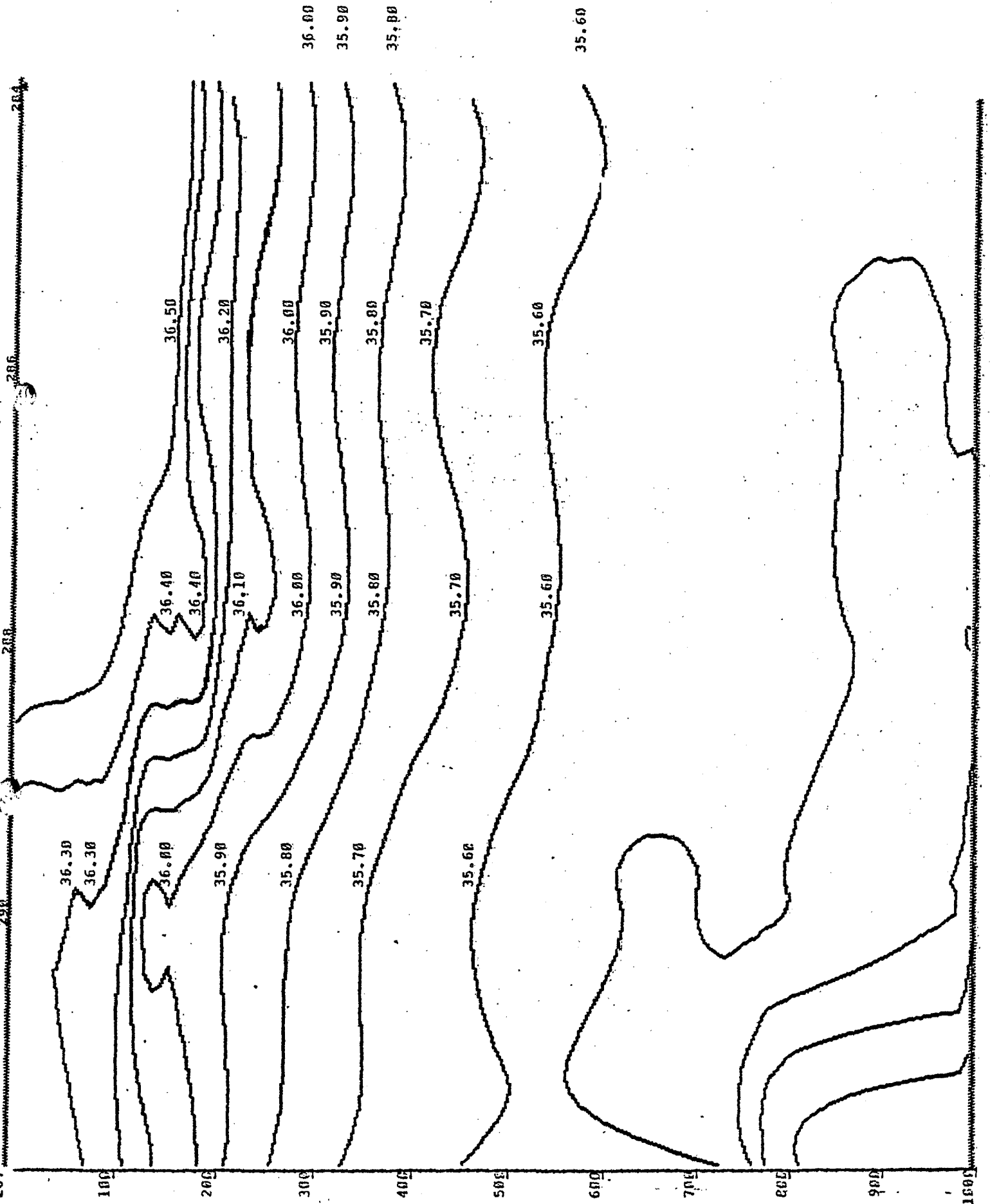
PROFIL 62
VERTIKALSCHNITT VON S1 MIT ISOLINIEABSTAND .050
SCHNITT G, NORD - SUEO AUF 20.12 WEST

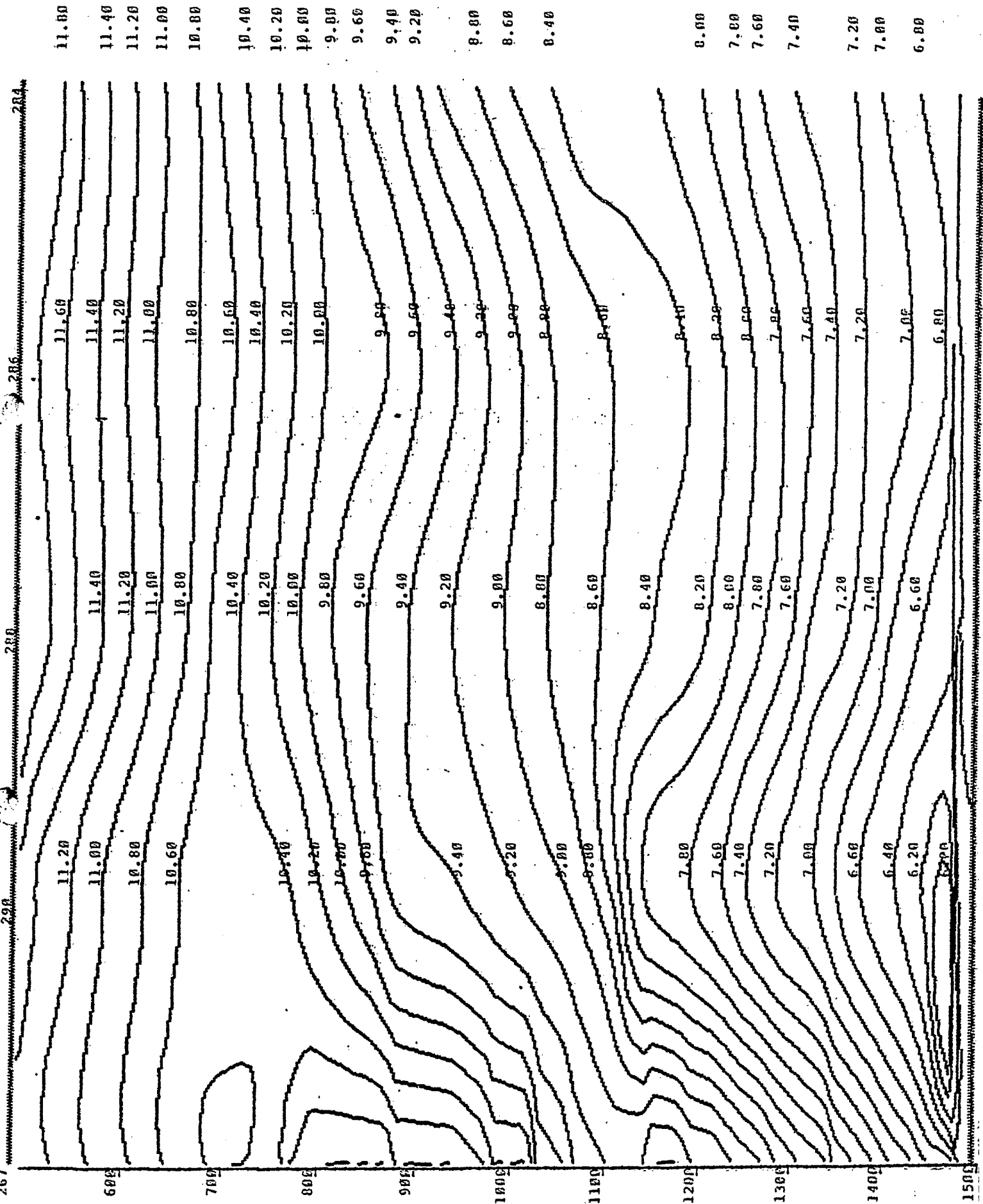


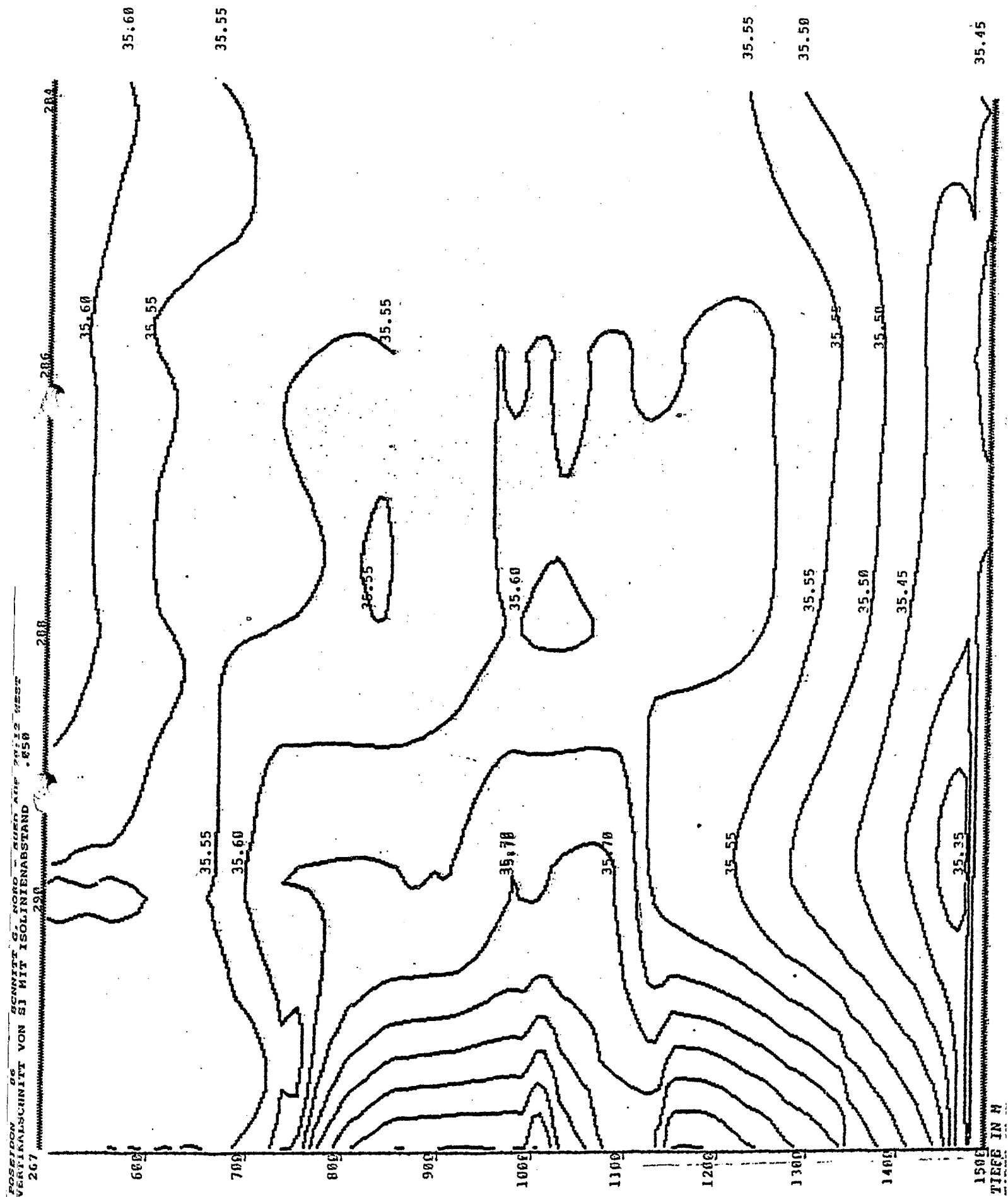
POSEIDON 86 SCHNITT G, NORD - SÜD AUF 20:12 WEST
 VERTIKALSCHNITT VOR T1 MIT ISOLINIENABSTAND .25C

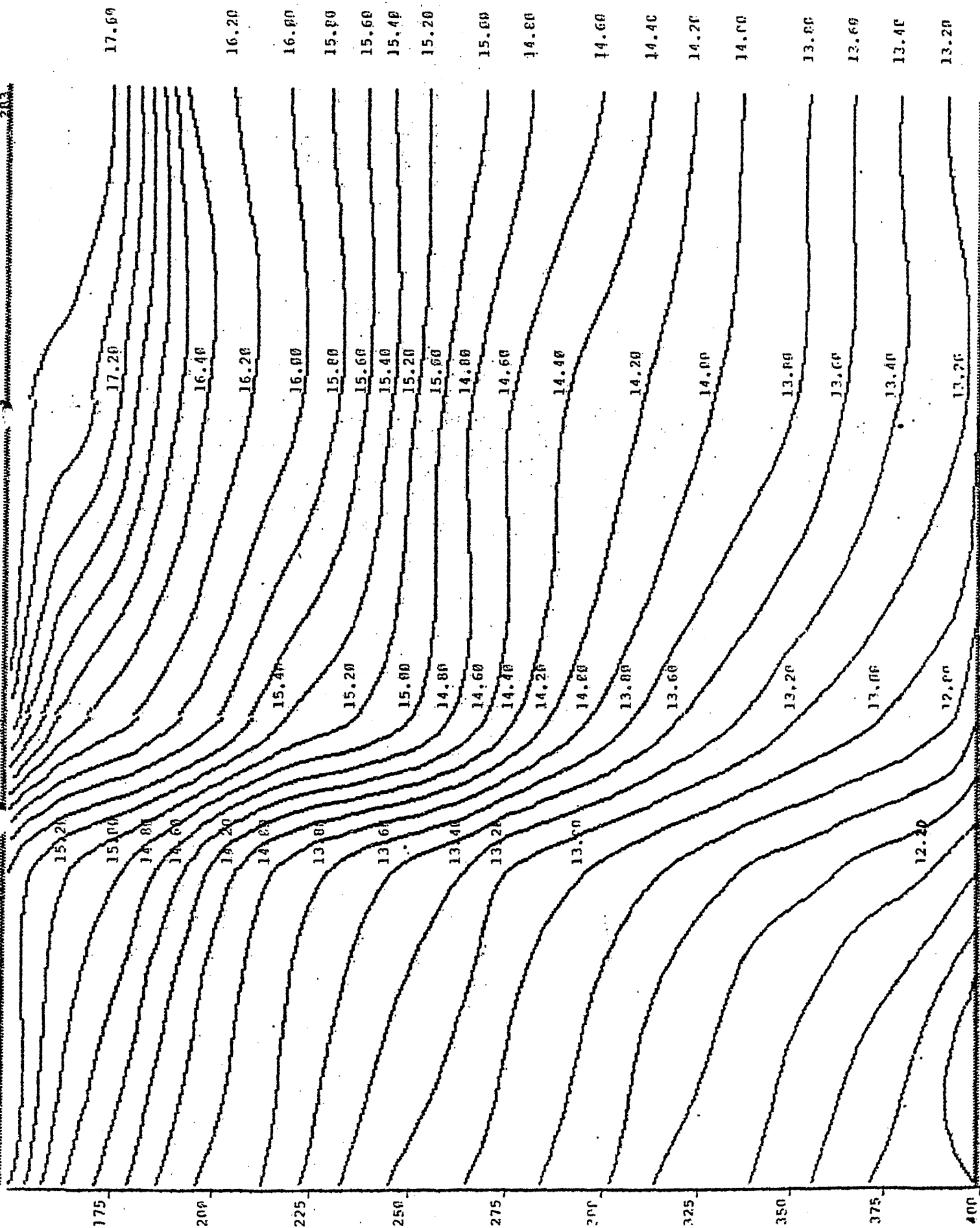


267
FÜHRER
VERTIKALSCHEIT VON SI MIT ISOLINENABSTAND .100
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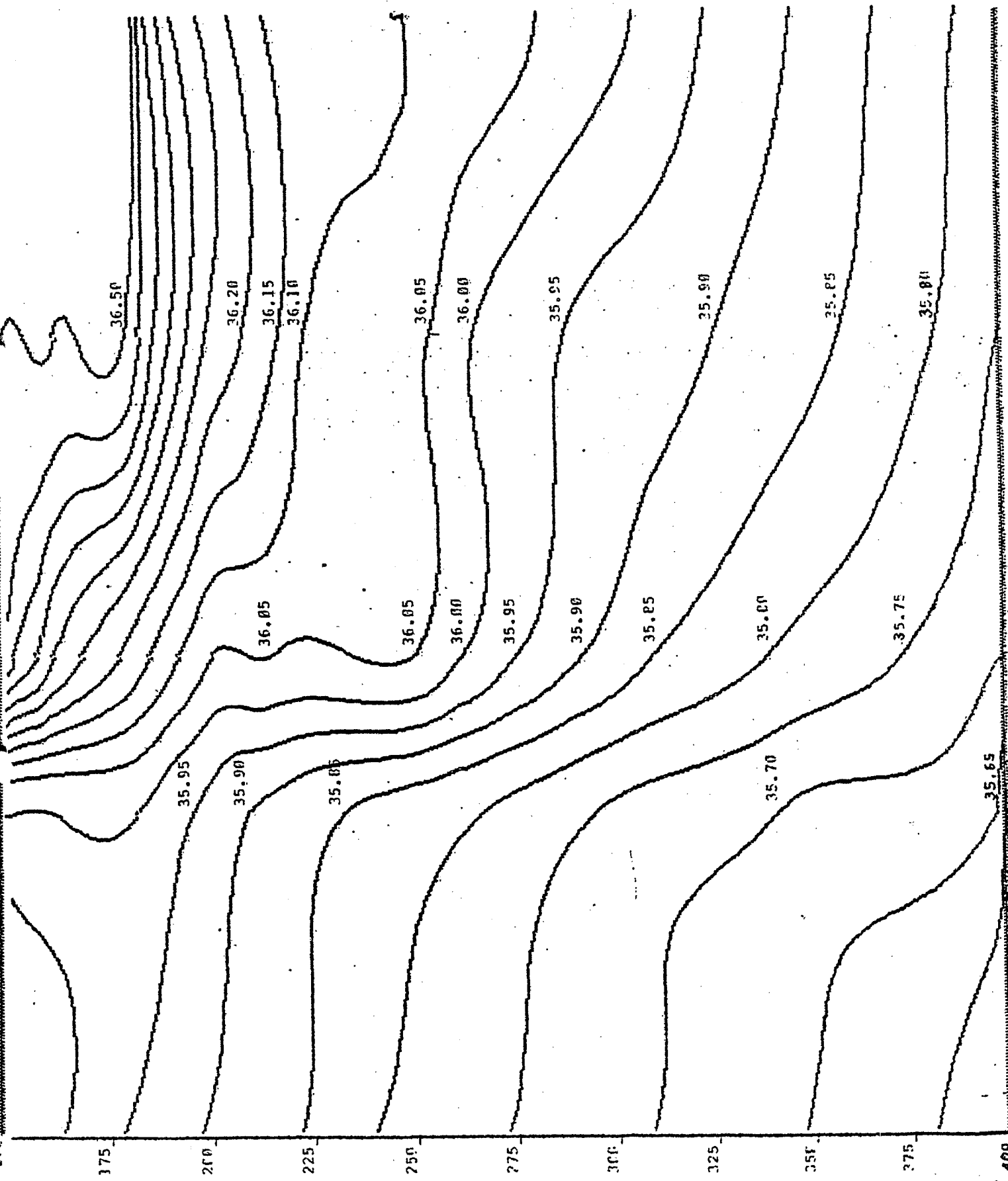






ROSEIPON 86 SCHNITT H. NORD - SUEO AUF 20140 WEST
VERTIKALSCHNITT VON SI MIT ISOLINIENABSTAND .050 205

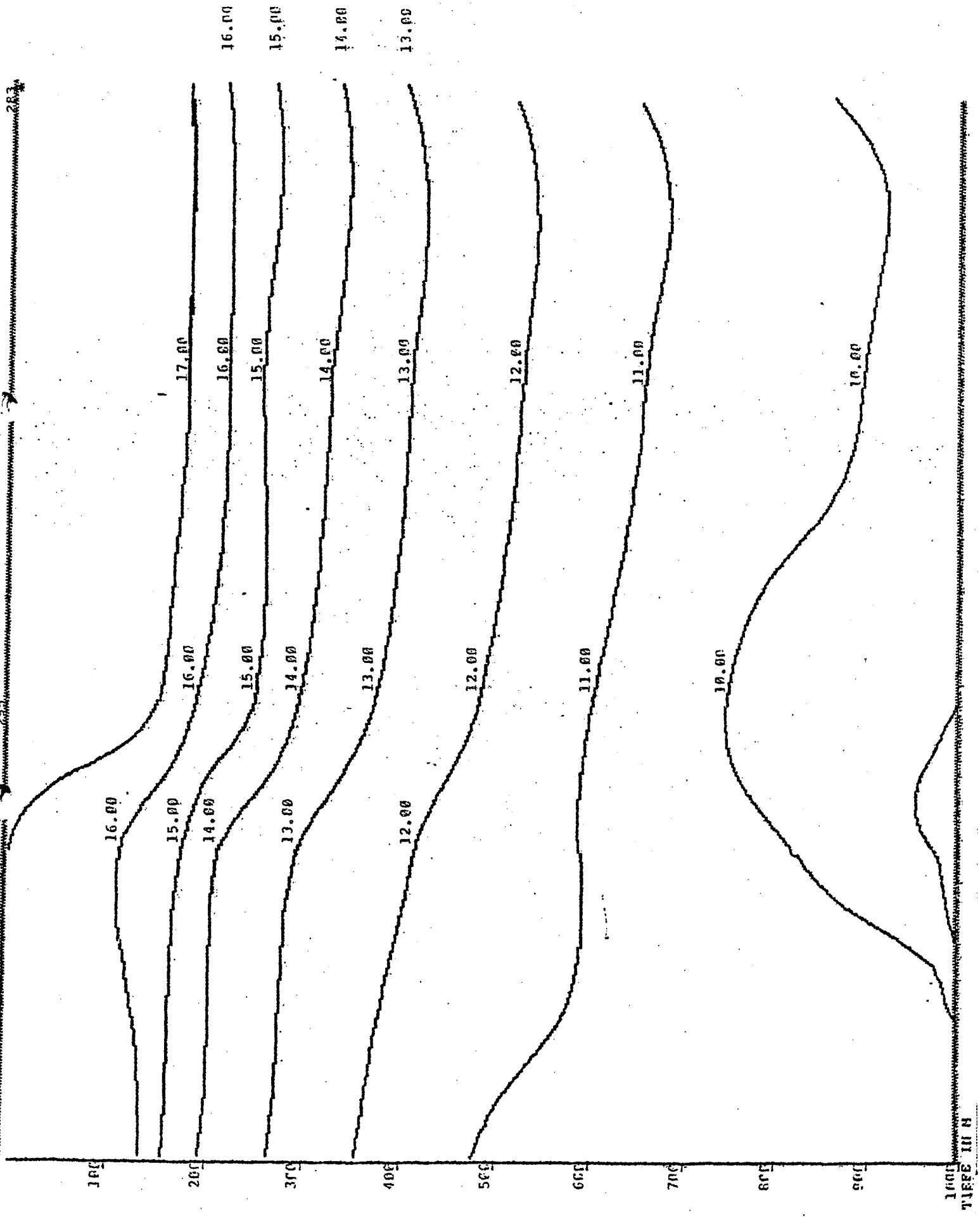
283

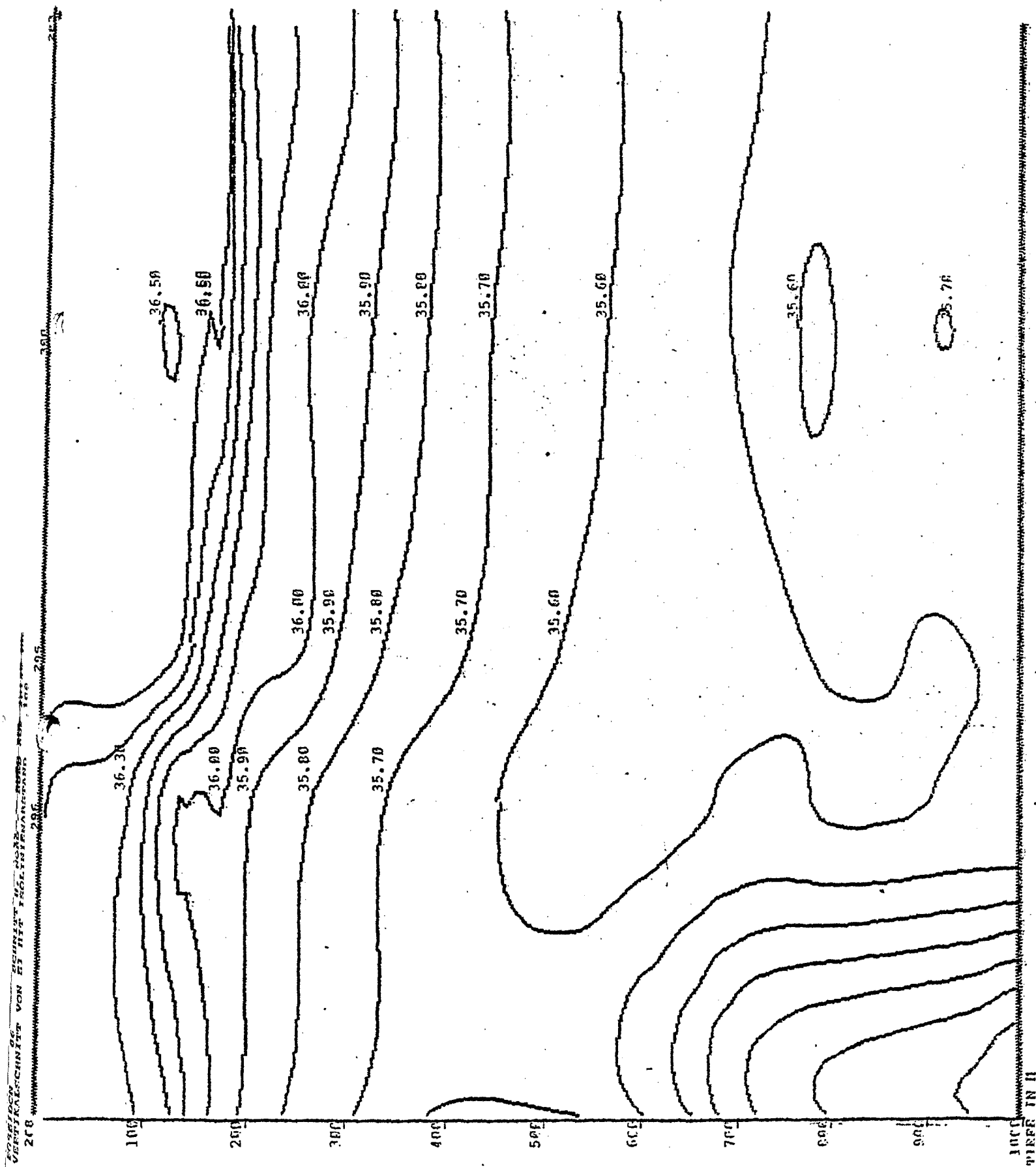


400

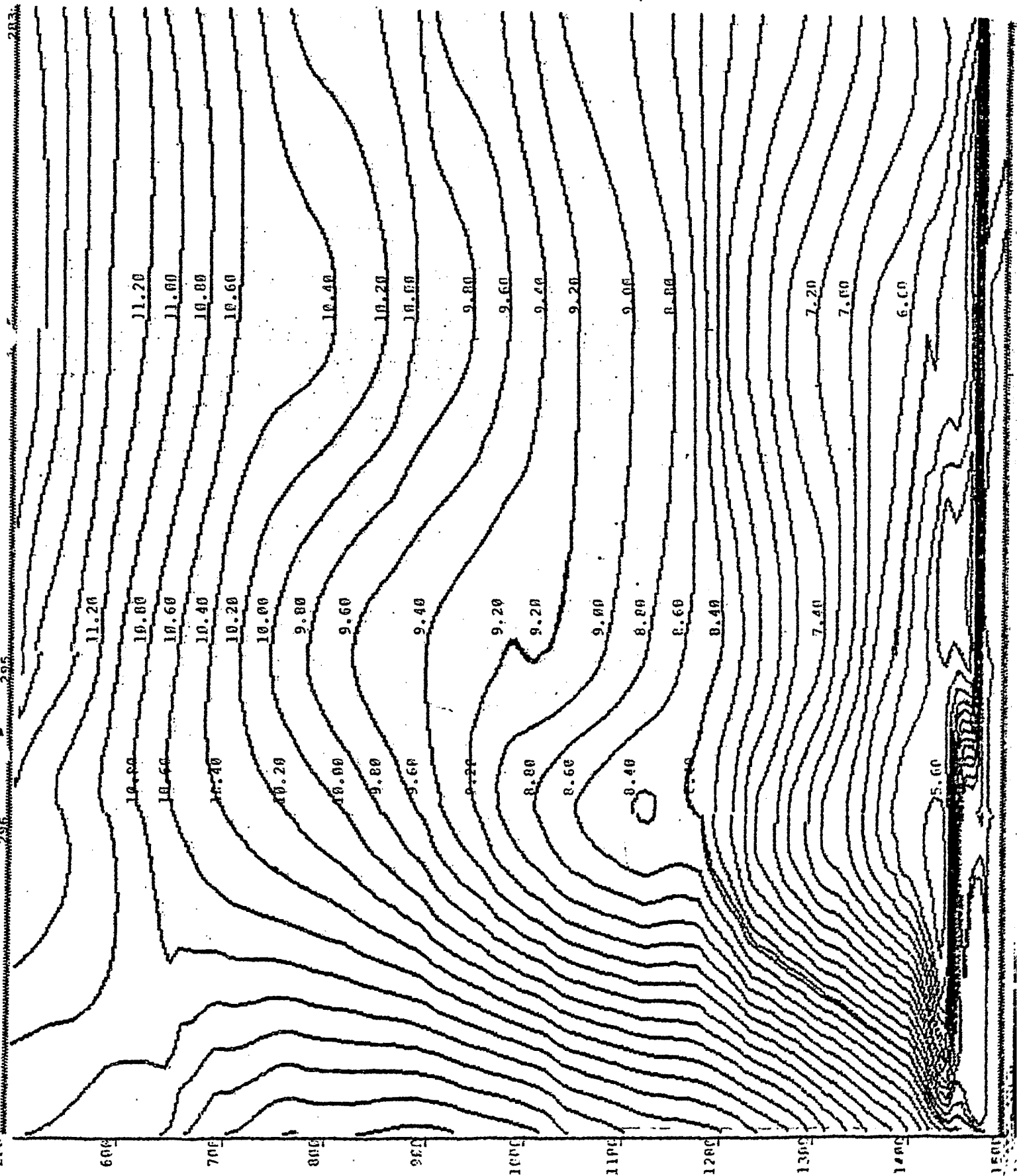
PROFIL 00 SCHNITT NORD - SÜD AUF 20.15 WEST
260 VERTIKALSKIZZE VON TI MIT ISOLINIEHABSTAND 1.00M

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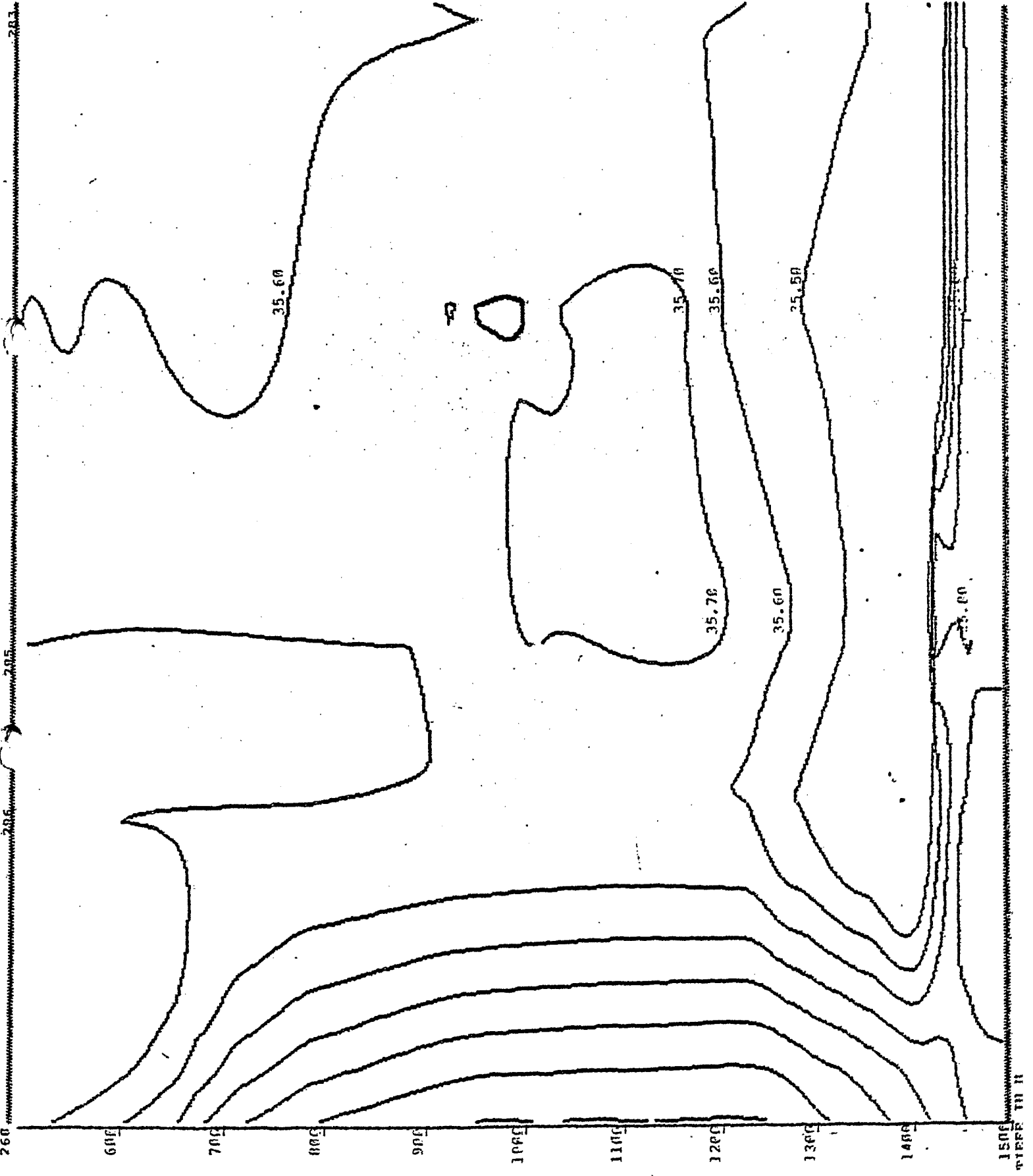


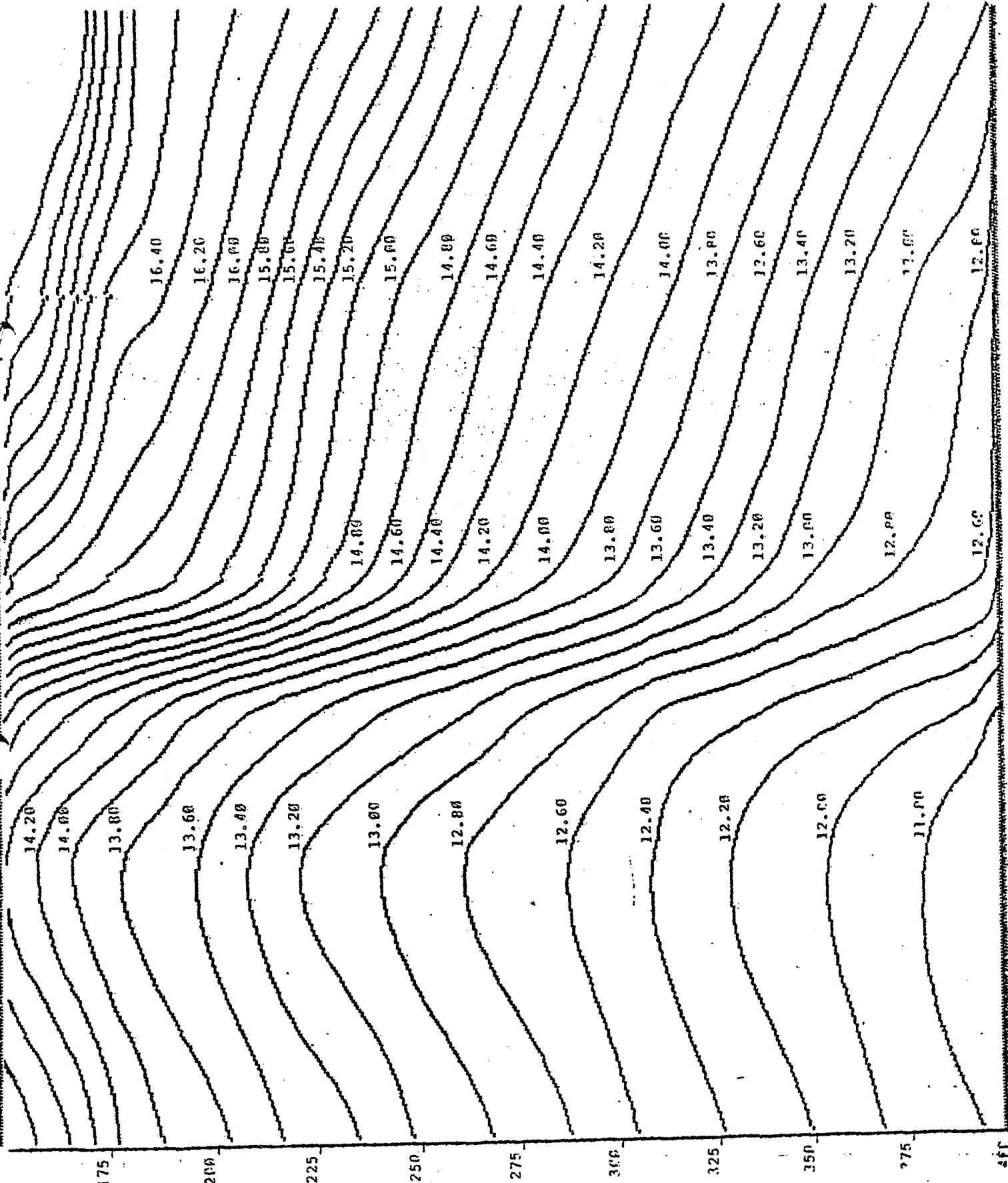


PROFIL
VERTIKALSCHNITT VON T1 MIT ISOLINIENSTAND 295
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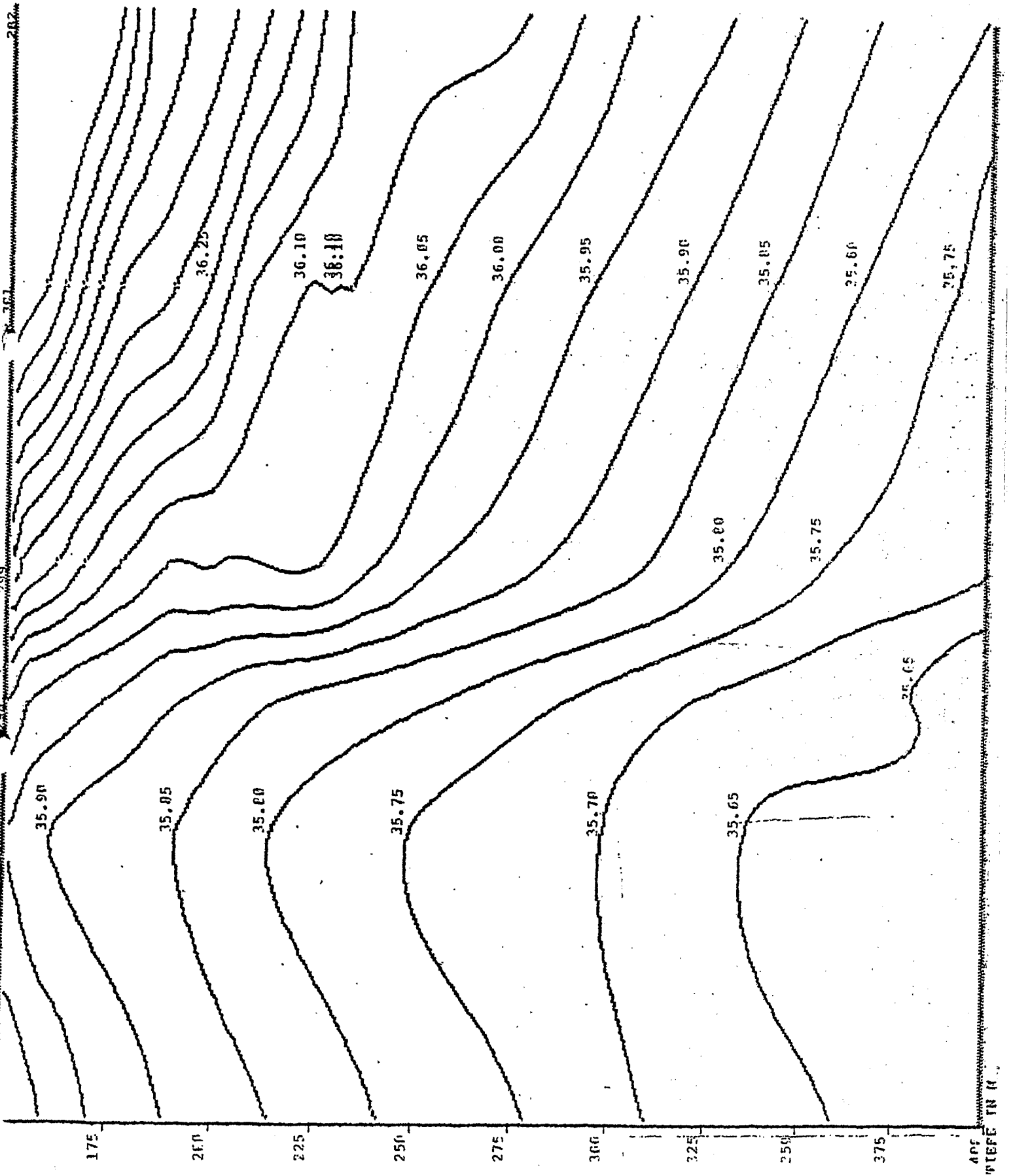
FORMELION 86
 VERZEICHNIS VON 55 MIT INFLUENZENDE 160 205 283





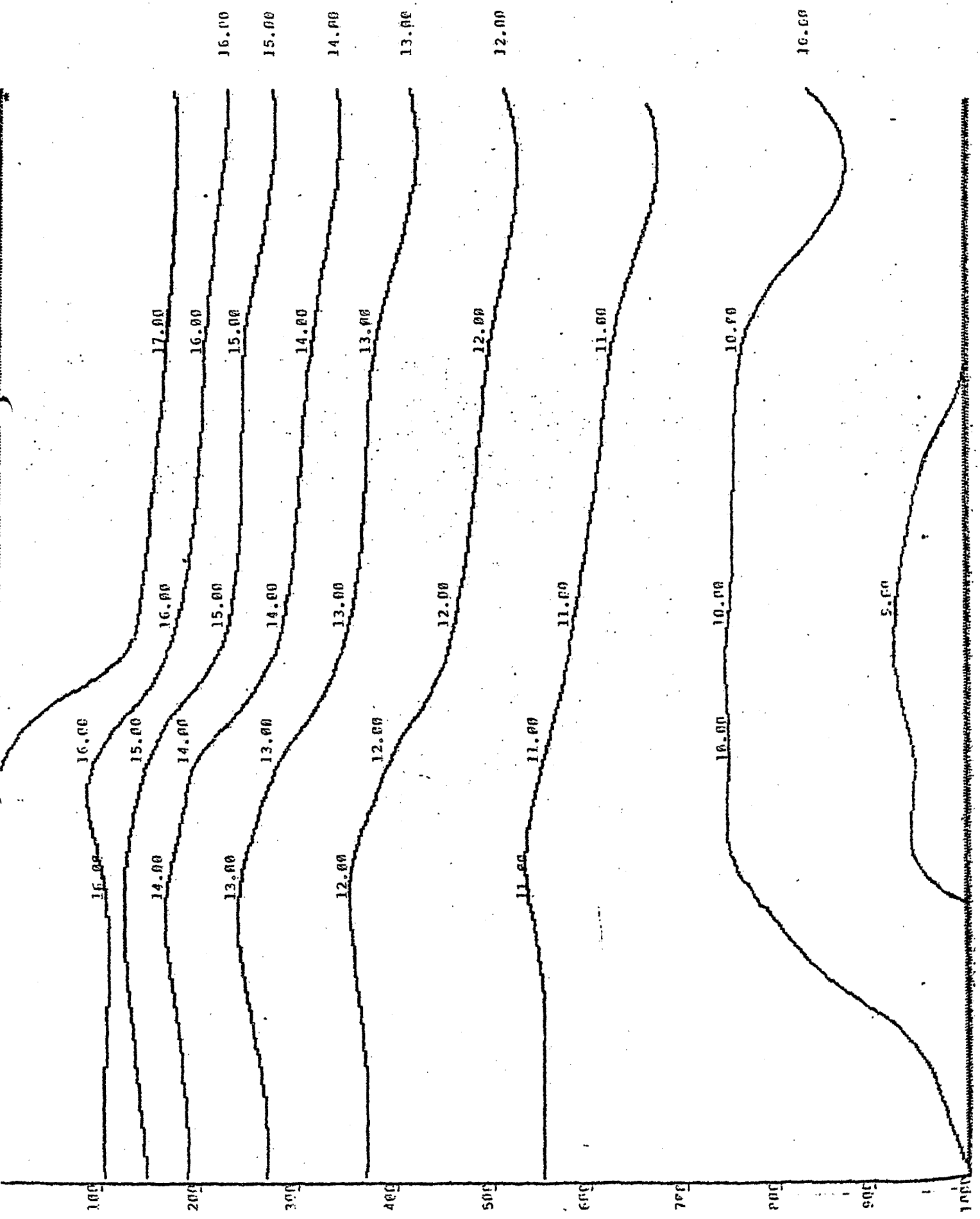
16.60
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VERGLEICHENDE VERMESSUNG VON 51 MIT 156 LÖSLICHKEITEN ZUGESAMMEN AUF 31.12.1962
269



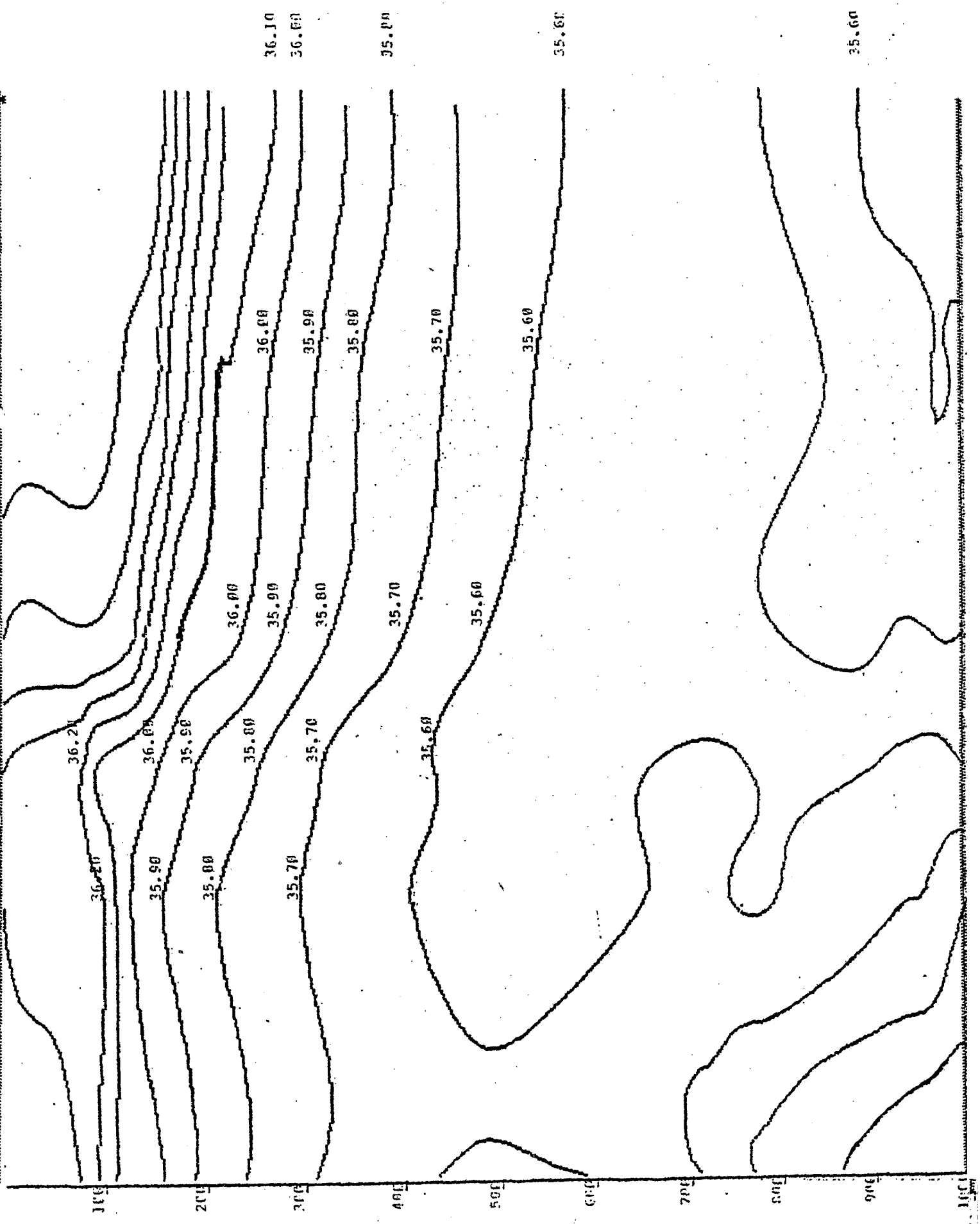
PROJEKTION 55
VERTIKALSCHNITT VON T1 MIT ISOLINIERABSTAND 1.000
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PROJEKTION
VERTIKALSCHNITT VON S1 MIT ISOLINIENABSTAND 0.100

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JOBBESEN 35
VERTIKALSCHNITT VON T1 MIT ISOLINIENABSTAND - 200
SCHNITT 1, NORD - SÜD AUF 21:27 WEST.
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